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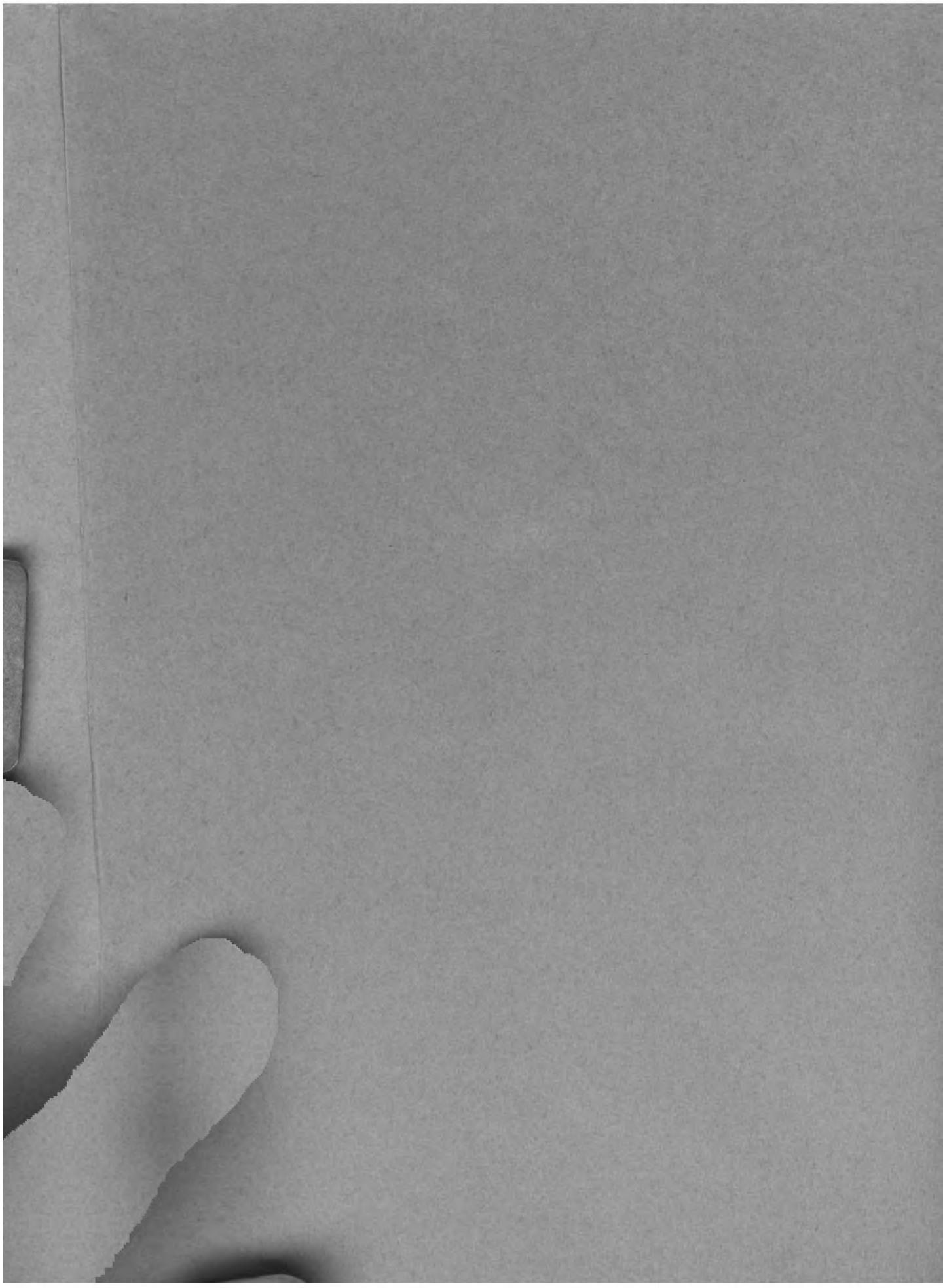

THE

CLINICAL JOURNAL

CLINICAL RECORD, CLINICAL NEWS, CLINICAL GAZETTE, CLINICAL REPORTER, CLINICAL CHRONICLE AND CLINICAL REVIEW

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THE BREAKING OF VICIOUS CIRCLES BY DRUGS.

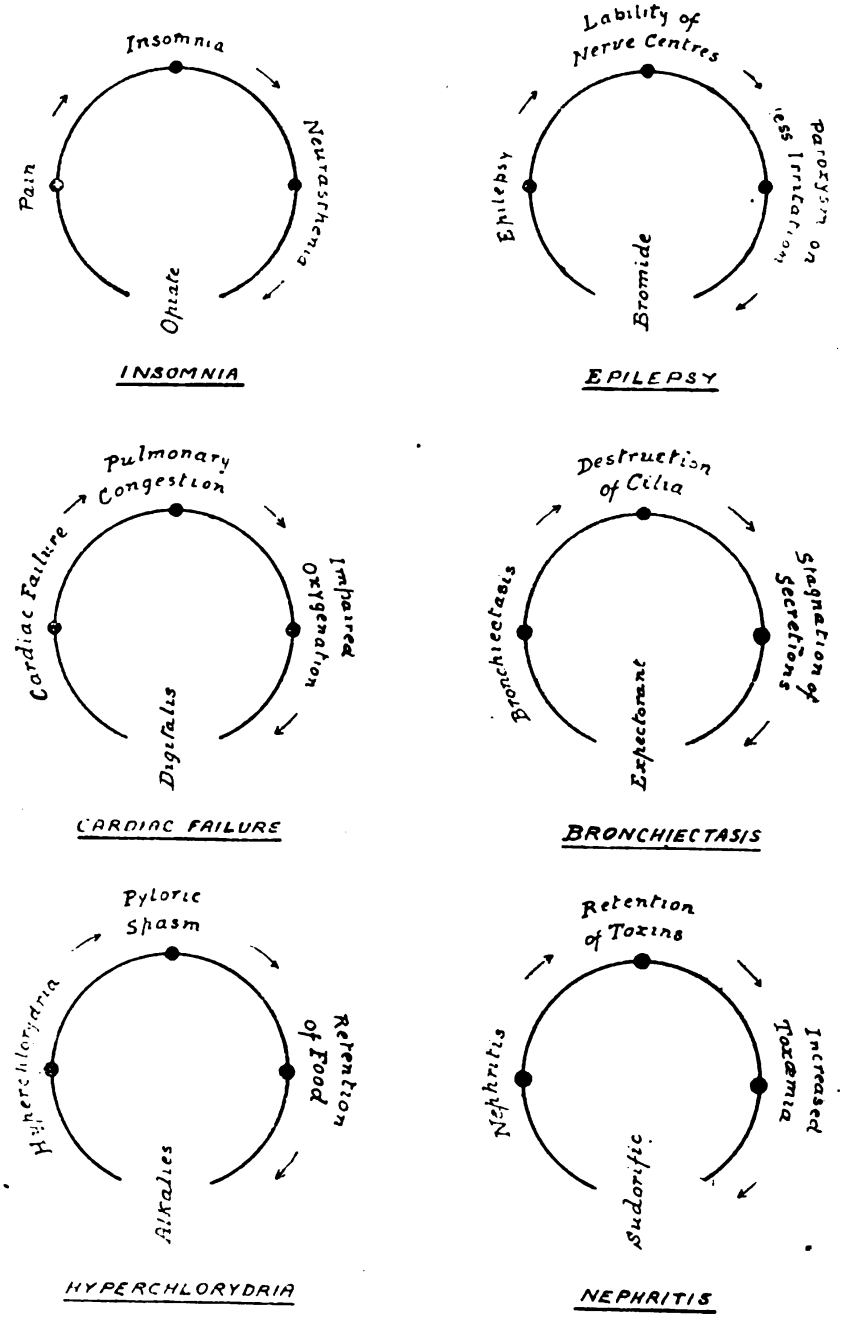
By JAMIESON B. HURRY, M.A., M.D.

THE *armamentarium medici* is often severely taxed when called upon to deal with disease that is complicated by a vicious circle, for under such circumstances the *vis medicatrix* is so perverted as to be, in some measure, a *vis devastatrix*. A self-perpetuating or even self-aggravating morbid process is in operation. Nevertheless, the well-directed resources of the healing art are frequently equal to the emergency. The regulation of diet, the administration of drugs, or the knife of the surgeon may all, in certain circumstances, succeed in breaking the injurious circular reactions. In this paper some examples will be given of the selection and adaptation of drugs to meet the difficulties created by the *circulus vitiosus*. The deeper the insight of the physician into the complex processes of pathology the more successful will be his treatment. *Qui bene diagnoscit bene medebitur* is as true to-day as when the apophthegm was enunciated centuries ago.

We shall deal first with some constitutional disorders associated with the nervous, vascular, digestive, and other systems; and afterwards with some local disorders.

(*a*) CONSTITUTIONAL DISORDERS.

Pain and insomnia.—Pain, insomnia, and a lowered neuron threshold form the links of a very common and grievous concatenation which is met with in various disorders, each link being both cause and effect. An aching tooth, a tender ovary, an overtaxed ciliary muscle, a palpitating heart, and so on may fix the consciousness of the sufferer on



The breaking of vicious circles by drugs.

the lesion, arouse phobias, produce insomnia, and steadily aggravate both suffering and misery. Under such circumstances the administration of a narcotic which secures sound sleep may be followed by such raising of the neuron threshold that pain vanishes as with the wave of an enchanter's wand. Evidently the drug acts on the paths by which a lesion affects consciousness; probably it interrupts those paths at their synapses in the region of the great cerebral ganglia. When irritability has been diminished, the stimuli again become subliminal and no longer prevent sleep. The sleep further diminishes irritability by allowing time for a renewal of the substances consumed by the discharge of energy and thus raising the neuron threshold.

There are, of course, many drugs that act as

narcotics, but none can rival morphia—τὸ φάρμακον νηπενθὲς—in efficiency. As Mitchell Bruce says: "Rest is urgently required for all cases of this kind, and has to be secured, in many instances, by means of morphine, which breaks the vicious circle of unrest and irritability, and, a beginning once made, rest begets rest."*

Another condition in which sedatives are invaluable is in what has been called the "most highly vicious circle in pathology"—viz. that which is associated with hæmoptysis and hæmatemesis, and largely accounts for the profuseness and prolongation of hæmorrhage. Not only does the tendency to cough and vomit tend to start the hæmorrhage afresh, but the associated mental perturbation raises the blood-pressure, and this operates in the same direction. The morphia or other sedative keeps the patient quiet mentally and bodily, and is therefore perhaps the most valuable drug for controlling the hæmorrhage.

Morphia is, of course, only a type of various sedatives that may be used for such conditions, but it is supreme in its power of dulling over-excitability and in producing a central hypalgesia. It has a greater power than any other drug *sedare dolorem—divinum opus.*

Epilepsy.—Certain disorders, such as epilepsy, are associated with a progressive proclivity to paroxysms which may be acquired through constant repetition, the attacks being probably due to explosive impulses arising in the cerebral cortex. Every attack increases the labile condition of the nerve centres, and, after being effect, becomes also cause; in other words, the neuron threshold is gradually lowered so that a given stimulus more and more readily provokes a paroxysm.

Such exaggerated excitability of the nervous system can be controlled by bromides—indeed, the prognosis in cases of epilepsy has been entirely changed since this treatment has been introduced. In a few cases there are no further attacks even when the drug is discontinued; the bromide may then be said to have cured the disease. But in the large majority of cases (90–95 per cent.) the number of paroxysms is greatly diminished, or the patient may be entirely free as long as the treatment is kept up, although the attacks return when the drug is discontinued.

* 'Principles of Treatment,' p. 230.

Bromides probably exert their beneficial influence by retarding the passage of impulses along the paths which connect the various motor and sensory centres in the brain. The earlier the fits are arrested the less fixed will be the proclivity to repetition. But even in the status epilepticus the drug renders service, although that condition has other self-perpetuating and dangerous complications which must not be neglected. Mott thus refers to the status epilepticus: "To stop the fits early and prevent the establishment of the vicious circle by chloral or bromide; to relieve venous congestion by purgation or enemata; to support the heart by nutrient enemata and stimulants, and, if necessary, relieve the engorged, distended right heart by venesection, appear to be the rational mode of treatment. When people die in the status epilepticus it is often because these measures have not been adopted soon enough."*

Paralysis.—In various forms of paralysis, such as those due to acute anterior poliomyelitis, there is a progressive increase of the disorder owing to loss of the reciprocal relations between the trophomotor neurons and their corresponding muscle cells. These two elements form but a single unit; disease of the one involves disease of the other. Sometimes the damaged neurons are unable to transmit any impulses down to the muscles; at other times these impulses are too feeble to evoke any responsive contraction. In either case the absence of response checks the nutrition and delays the recovery of the neurons.

It is in such conditions that the elective action of strychnine on the reflex arcs of the nervous system is most valuable. Even small doses may so raise the irritability of the neurons that they may again be affected by peripheral stimuli from the muscles, nutrition and repair thus being promoted. By this means the activities of the receptive organs in the cord and brain which have been depressed by degenerative processes may, in some measure, be restored by strychnine, so that the reflex mechanism again responds to physiological stimuli.

The action of the strychnine is probably localised at some point between the entrance of the affected fibre and the synapse of the motor cell. At that point the passage of impulses through some of the synapses of the spinal cord is facilitated.

* 'Archives of Neurology,' i, p. 502.

Cardiac failure.—Circulatory insufficiency may result from disease of the myocardium or of the valves, when the resulting interference with the circulation of the blood is not adequately compensated. The principal compensatory change is brought about by hypertrophy of the muscles of one or more of the heart chambers, which are thus enabled to pump out the blood in sufficient quantity and with sufficient force to supplement any deficiency in the circulation. Later on, however, as a result of progressive valvular or myocardiac disease or of impaired nutrition, compensation usually breaks down and stasis develops in the pulmonary or systemic circuit or in both, with secondary results—pulmonary and portal congestion, ascites, œdema, etc.—which aggravate the cardiac failure.

Under such conditions digitalis and other plants of the digitalis series are the sovereign remedy for breaking the dangerous circles that have been established. A ventricle which has become insufficient can, under the influence of digitalis, contract more efficiently. The immediate effect of this will be to improve the coronary circulation, which, in its turn, will tend further to promote a vigorous systole. There will also be a lowering of the excessive peripheral vaso-constriction which has been kept up by the medullary centres in order to keep themselves supplied with blood, but which is now no longer required. This will lighten the burden imposed on the failing myocardium.

Thus is brought about an improvement both in the *vis a tergo* and in the *vis a fronte*, as a result of which the blood which had accumulated in the venous system returns to the heart and arteries, thus further benefiting the myocardium. The condition of the blood also improves since the impaired processes of secretion, excretion, and aeration grow more active, and the purer blood tends to improved nutrition.

Another effect of digitalis is to increase the tone of the myocardium, and thus to moderate tachycardia. An enfeebled myocardium is compelled to beat rapidly in order to carry on the circulation, even though such rapid action leads to progressive weakening, since the chambers can neither fill nor empty themselves as they should. With increased tonicity, the systolic output is increased, so that fewer beats are required.

Pavlov writes:

"An uncompensated heart beats rapidly, and thereby only aggravates its condition. Its time of rest—that is, of recovery, of restitution of the organ—is shortened. A vicious circle is set up. The weak action of the heart lowers blood-pressure, the lowering of this leads (from known physiological causes) to an increase in the number of beats, the quickening leads to weakening of the organ. Without doubt the digitalis aids by breaking through this vicious circle, in that it greatly slows the pulse, and thereby gives new power to the heart." *

This slowing action of digitalis is especially beneficial in auricular fibrillation, and may be due to a retarding action on the conductivity of the Bundle of His and to a diminished irritability of the motor ganglia in the heart.

As a result of the improved tonicity, the auricular and ventricular orifices contract, so that the valves, even though damaged, close the orifices more completely, and thus lessen regurgitation. There is also less tendency to over-distension during diastole. The increased diuresis brought about by the administration of digitalis is of further benefit by relieving the general œdema, which so often complicates cardiac failure, and throws so much extra work on the myocardium. The kidneys share in the general acceleration of the blood-flow and secrete more vigorously. The accumulated fluid in the tissues tends to return to the blood-vessels and to be excreted by the kidneys. With diminishing ascites the pressure on the renal veins is relieved and so progress is accelerated. Thus, in various ways, digitalis helps to break circular reactions; no wonder that it is regarded as the sheet-anchor in heart disease.

Angina pectoris.—Angina pectoris is another disorder which is frequently complicated by a circle, which can often be broken by the administration of amyl nitrite. The drug is most successful in the form of angina known as "angina pectoris vasomotoria," *i. e.* attacks of vaso-constriction associated with a high blood-pressure. In such cases the effects of amyl nitrite are unsurpassed in certainty. Clifford Allbutt describes this form of angina: "Vaso-constriction often becomes an active part of angina. A movement or an emotion raises arterial pressure; by this the sore parts are

* 'The Work of the Digestive Glands,' p. 233.

annoyed, and the medullary centres being irritated, pressures may rise more and more, and a vicious circle be established until, by nitrites, pressures are reduced, or by morphia the centres blocked."* When administered in the form of an inhalation, the drug gives speedy relief, sometimes in less than a minute, and, although the vaso-dilation brought about may only be temporary, the distressing symptoms may be arrested for a considerable period. Other nitrites, such as sodium nitrite, exert a similar effect to amyl nitrite, although their use is less convenient. On the other hand, their effect may last longer.

Anæmia.—Anæmia is frequently a self-perpetuating condition through its effects reacting upon and aggravating the cause. Hence its chronicity. The administration of iron seems beneficial in all forms of primary anæmia, and arrests the reciprocally acting correlations. It is in the chlorotic form, however, that the drug achieves its most brilliant triumphs. In fact few drugs can be more confidently relied upon to interrupt the circular reactions associated with a disease. A large proportion of chlorotic girls recover completely. In chlorosis there is always a deficiency of hæmoglobin, and usually a deficiency of red blood-corpuscles which may be due to insufficient food or to excessive menstrual loss.

In a healthy woman's diet, the average daily amount of iron is only 6-8 mgrm. ($\frac{1}{11}$–$\frac{1}{8}$ gr.), and as this only just balances the excretion, a very small margin is left for hæmopoiesis.† If, therefore, the average intake is reduced by dyspepsia, or if the output is increased by menorrhagia, the body gradually becomes depleted of iron, and the hæmoglobin is the constituent which suffers most. Hence result breathlessness, cardiac weakness, and œdema. When, however, iron is taken in addition to that contained in the ordinary food, hæmopoietic activity is gradually increased, and both the proportion of hæmoglobin and the number of red corpuscles increase. The value of iron has been established not only clinically but by experiments on the lower animals, which show that iron may not only be utilised as material for the synthesis of hæmoglobin but also exerts a specific action on the blood-marrow and other blood-forming organs.*

Bronchitis.—Recovery from bronchitis greatly depends on the success with which *natura medicatrix* can get rid of the large quantity of mucus and other secretions which are poured out into the bronchial tubes, and which tend to obstruct the free passage of air. Such expulsion is brought about by means of cough and by the ciliated epithelium which tend to remove impurities from the lungs. In severe attacks of bronchitis, however, these natural agencies fail to achieve their object. The retained secretions become infected with bacteria, and destroy the ciliated epithelium. Bronchiectasis and emphysema may also supervene with impaired power of expectoration. Often, indeed, the bronchiectasis causes stasis and *vice versâ*.

These various circular reactions may be more or less broken by expectorants. Some drugs, *e.g.* carbonate of ammonia, stimulate ciliary action and assist in the removal of secretion, or excite the unstriped bronchial muscles which expel the secretions from the alveoli into the bronchial tubes. Others, such as ammonium chloride, facilitate the removal of secretions by increasing their alkalinity. Yet others, such as terebene or turpentine, may exert some disinfectant action and check bacterial growth. Ipecacuanha both increases bronchial secretions and renders them more liquid, so that the mucus can be more easily expectorated. Moreover, the increased secretions sometimes do good by protecting the inflamed and irritable mucosa from cold air and renewed catarrh. Where it is desirable to liquefy tenacious phlegm, creosote or benzoin may be used in an inhaler or a nebuliser. In all these ways injurious circular reactions may be arrested.

Asthma.—Asthma is another respiratory disorder complicated by a *circulus vitiosus* which can often be broken by drugs. "Emphysema, bronchial catarrh and disease of the right heart all increase the tendency to asthmatic attacks, which in turn increase the severity of the complications, and so the patient lives in a vicious circle."† No single drug succeeds in arresting the paroxysms in every asthmatic patient. But stramonium, nitrate

* 'Diseases of the Arteries, including Angina Pectoris,' ii, p. 236.

† Hale White, 'Pharmacology and Therapeutics,' p. 372.

* Chlorosis in plants is due to an insufficiency of iron in the green chlorophyll of plants, and can be cured by the administration of iron. H. M. Ward, 'Diseases in Plants,' p. 180.

† Short, "Index of Prognosis," p. 132.

of potash, chloroform, morphia, may all act as specifics under certain circumstances. By arresting the paroxysm they relieve the correlated disorders which helped to excite the paroxysm.

Chronic gastritis.—Chronic gastritis is often complicated by impaired secretion, absorption, and peristalsis, these several factors aggravating each other. Ewald has admirably described the reciprocation of events: "Defective muscular movement reacts by diminishing the activity of absorption, defective absorption leads to stasis in the venous area, and this again to injury to secretion, so that a vicious circle is created. You can easily perceive that it is quite the same at whichever end you begin this chain; whether the first trouble is secretory or motor, or absorption is affected, the same results must always follow, unless the failure of one function can be compensated for by the stronger action of another, by which the disturbance might be rectified."* Such a self-perpetuating form of gastritis is frequently cured by the administration after meals of dilute hydrochloric or other mineral acid with which a suitable diet must, of course, be combined. It is not certain in what way the drugs act. According to Cushny the acid both arrests the lactic fermentation which is so often present, and increases peristalsis. At any rate, patients often express themselves as immensely benefited by a remedy to which some physicians have attributed their great success in curing chronic dyspepsia.

Hyperchlorhydria.—A remarkable circular reaction is sometimes associated with what is known as Reichmann's syndrome, in which stasis, hyperchlorhydria, and pyloric spasm reciprocally perpetuate each other. The syndrome is characterised by paroxysms of severe pain coming on 3 or 4 hours after meals and probably connected with spasm of the pylorus. In these cases a dose of bicarbonate of soda frequently gives complete relief by neutralising the excess of acid, followed by relaxation of the spasm, the retained food being thus enabled to pass into the duodenum. Another plan recommended by Mathieu is the administration of the alkali in small doses as soon as the approach of pain is felt, the dose being repeated every 5 minutes until the spasm ceases.† The attacks of pain may often be completely arrested by such a treatment extending over a few days.

Gastrectasis.—An obstinate vicious circle is sometimes present in cases of chronic dilatation of the stomach associated with prolonged retention of food. The dilatation conduces to stasis and the stasis to dilatation. The administration of an emetic such as ipecacuanha or sulphate of zinc may at once arrest these reciprocating factors. Even a greatly dilated and overloaded stomach may again be braced up, the unburdening being followed by renewed tonicity and functional activity. The emesis relieves the stasis; the relief of the stasis cures the gastrectasis.

Habitual constipation.—Habitual constipation is frequently due to a neglect of the natural call, the resulting retention of fæces being followed by an undue absorption of their fluid constituents. The reduced mass of dry fæces is then unable to excite adequate peristalsis, so that there is an interplay of cause and effect which accounts for the obstinate coprostasis that is so often met with. This circular reaction is readily interrupted by a saline cathartic, such as sodium sulphate, which, being but slowly absorbed by the intestines, entails the simultaneous slow absorption of the water in which the drug is dissolved. If, therefore, a dose of sodium sulphate dissolved in water is administered, a much larger quantity of water will reach the large intestine than when a similar quantity of ordinary water is drunk. The intestinal contents are thus rendered more fluid than usual, and pass more easily on towards the rectum. At the same time the bulk of fluid and the distension of the bowel promote a more active peristalsis, and the whole alvine contents are easily evacuated.

Another invaluable drug for habitual constipation is cascara sagrada, since it not only empties the bowel of fæcal matter, but simultaneously acts as a tonic to the intestinal walls, and thus prevents the constipation which follows the use of most drugs.

Parasitic infection.—Parasitic infection of the intestines occasionally establishes circular reactions which may be arrested by drugs. A familiar illustration is presented by oxyuriasis, a disorder in which continual reinfection occurs as a result of the anal irritation, which, especially in children, leads to infection of the fingers with ova, which are then liable to be transferred to the mouth and eventually regain the intestines. This circle may

* 'Diseases of the Digestive Organs,' ii, p. 484.

† Mathieu and Roux, 'Pathologie Gastro-Intestinale' (1913), Series IV, pp. 90, 96, 98.

be broken by enemata of quassia. But since the parasites lodge mainly in the cæcum and continue to descend into the rectum in successive swarms during the last 4 or 5 of the 6 or 7 weeks following a single infection, the treatment, to be permanently successful, must extend over this period as a minimum. A pint of quassia infusion for an adult or 5 ounces for a child will destroy such worms as are lodged in the rectum, and as soon as all the parasites have descended from the cæcum and have been killed by further injections, a radical cure ought to be effected, provided that no fresh auto-infection has been allowed. The irritation round the anus may be relieved by a weak mercurial ointment or by sponging with carbolic lotion.

Nephritis.—Nephritis is frequently a self-perpetuating condition owing to the secondary retention of toxins, which, in their turn, further impair renal activity. Toxæmia may thus be both cause and effect of nephritis. Adami thus describes the condition: "Functional inadequacy of the kidneys is not without its effect upon the composition of the blood. The quantity of water eliminated may deviate considerably from the normal, and waste products may be retained instead of excreted. The quality of the blood is thus depreciated, and, being laden with toxic substances, it in turn exerts an irritating and deteriorating effect upon the kidneys. In this way a vicious circle is set up, as a result of which the condition of the patient goes rapidly from bad to worse."*

The reciprocation may frequently be interrupted by a profuse diaphoresis which withdraws large quantities of water together with salts and toxins by way of the skin, and thus brings relief to the kidneys. One of the best drugs for the purpose is pilocarpine, by far the most powerful sudorific in the Pharmacopœia, and one which, if injected hypodermically, usually produces profuse sweating in 10 or 15 minutes. The diaphoresis lasts about two hours, during which as much as 2 kilos of fluid may be excreted. The functional activity and nutrition of the kidney are often greatly promoted and the injurious reactions arrested. Such an aperient as magnesium sulphate may also assist in breaking the circle, by eliminating impurities by the bowel and thus relieving the toxæmia.

* 'Principles of Pathology,' ii, p. 735.

(*b*) Local Disorders.

Glaucoma is a remarkable self-perpetuating local disorder. In the words of Priestley Smith, "cause and effect react upon each other in a vicious circle, and the glaucoma intensifies itself." Nevertheless, the morbid process can sometimes be arrested by the use of such a myotic as eserine. It is especially in the premonitory stages and in the inflammatory forms of glaucoma that this drug is of incontestable efficiency. If on the first indications of an attack eserine is instilled into the eye myosis shows itself in from 20 to 40 minutes, and all the symptoms may be relieved without leaving a trace behind them. As the pupil contracts, the increased intra-ocular pressure subsides, the cornea becomes clear, intra- and peri-ocular pains vanish, visual acuity returns.* Such treatment may result in a complete cure without the necessity of surgical interference. The value of the drug lies in its power of dilating Fontana's spaces by causing the iris to be stretched in a radial direction and so drawn away from the wall of the eyeball. Filtration processes are thus promoted. Unhappily, however, symptoms of glaucoma usually return.

Nasal obstruction.—The vicious circle associated with obstructive hypertrophic rhinitis may be broken by such a caustic as trichloracetic acid, which may be applied to the turbinal tissues so as to form linear scars. In a few days the resulting cicatrices will contract, so that the nasal passages again become patent. In this way the self-perpetuating process is brought to an end.

Corns.—Corns owe their persistence in large degree to a self-perpetuating factor. As often as pressure is applied, the central core irritates the hypertrophied papillæ of the corium, as a result of which they are stimulated to increased proliferation. The more the papillæ grow the more the projecting corn is liable to pressure, and *vice versâ*. The gyration may be arrested by the application of salicylic acid which causes necrosis of the core of epithelial cells. The entire corn is thus got rid of, so that there is no longer the hypertrophied mass which before was continually exposed to pressure and irritation.

Scabies.—The extension of scabies is largely the

* 'Encyclopédie Française d'Ophtalmologie,' v, p. 142.

result of the itching and scratching caused by the acari, the parasite being transferred from one part of the skin to another by means of the finger-nails. This self-perpetuating disorder may be cured by a variety of applications, of which the popular and best is sulphur ointment. The male parasite remains on the surface of the skin, and is readily destroyed by sulphur, but the female burrows under the epidermis so that the epidermal covering of the burrows must first of all be softened by soaking in hot water, and removed by a rough towel. The female parasite will then be exposed, and is quickly killed by the ointment. If at the same time the clothing is disinfected, the circular reactions will be speedily broken and the disease cured. Similar principles apply to the treatment of pediculosis.

Pruritus.—Pruritus may be a self-perpetuating condition quite apart from the presence of parasites, and occurs most frequently in connection with certain parts of the body, such as the anus or the vulva. So intense may be the itching that the sufferer cannot refrain from scratching, and this, while giving temporary relief, in reality accentuates the trouble. Frequently the scratching even produces organic changes in the skin, which lead to further pruritus. Various local applications such as carbolic or perchloride of mercury lotions may act like a charm in arresting this disorder and curing the patient. In other cases a neurotic element is present which needs constitutional treatment.

These few examples may suffice to indicate how the study of injurious circular reactions may assist in the selection and adaptation of remedies. Indeed, a large part of the *ars medendi* consists in discovering the *locus minoris resistentiæ* and applying remedies on the principles discussed in this paper. The history of medicine shows that in the past much of our therapeutical gold has been mixed with dross. Indeed, even Homer knew that φάρμακα πολλὰ μὲν ἐσθλὰ μεμιγμένα, πολλὰ δὲ λυγρά—"Many remedies in the cup are healing, but many are also harmful." * If the prescription of drugs is studied from the point of view of the *circulus vitiosus* there will be less empiricism; therapeutics will be more rational and more successful.

* 'Odyssey,' iv, p. 230.

DIATHERMY.

By E. P. CUMBERBATCH, M.A., B.M.Oxon., M.R.C.P.,
Medical Officer to the Electrical Department, St. Bartholomew's Hospital, etc.

THE subject of the present paper is the use of diathermy in medicine and surgery, with an introductory account of the meaning of the term and the way in which it is produced.

Diathermy means, literally, heating through. The term expresses the *distribution* of the heat. Not only is the surface of the body heated, but also the underlying tissues, through and through. All the methods which have been utilised hitherto for applying heat to the body raise the temperature of the skin only. A hot-water bottle or hot iron will raise the temperature of the skin, but the heat will not penetrate deeper because the epithelium is a very bad conductor. Hot water and hot air will diffuse into the horny layer of the epidermis and so cause a slightly deeper penetration of heat. The heat rays from an electric lamp penetrate a very short distance only and do not reach beyond the skin. The circulating blood in the capillaries immediately beneath the epidermis carries away the heat that reaches the deepest layers of the epithelium, and so prevents the elevation of the temperature of the parts below the epidermis. Dry heat, moist heat and radiant heat, therefore, raise the temperature of the surface, not of the deeper parts—they produce "epithermy," not diathermy. Long-continued heating of the skin will ultimately cause a rise of temperature of the whole body because the blood, heated in its passage through the vessels beneath the epidermis, will itself carry the heat to the other parts of the body. Surface-heating, therefore, will ultimately cause a conveyance of heat to the deep tissues. The heat is thus conveyed *indirectly* and to the whole body. When the term "diathermy" is used it implies the heating of the deep tissues by a totally different method. The deep tissues are heated *directly* and *locally*, the fixed tissues as well as the fluids circulating within them.

How Diathermy is produced.

Diathermy is produced by passing an electric current through the tissues. It is a well-known

physical fact that if an electric current is passed through a resistant conductor heat is developed in the latter as it overcomes its resistance. The resistance of the body is relatively high, and if a sufficiently strong current is passed through it, heat will be developed on the path of the current and raise the temperature of the tissues. The body, however, can tolerate only small currents. If an electrode measuring 1 sq. in. in area is placed in contact with the skin and used to convey the current into the body, a pricking, stinging sensation is perceived when a current of 10 milliampères is passing, and the pain becomes unbearable with a current of 15 milliampères. A current of this strength is quite insufficient to heat the tissues. With an electrode of the size mentioned at least 400 milliampères are required. A galvanic current of this strength would cause very severe pain and would blister the skin. A faradic or alternating current would cause intolerable contraction of the muscles in the vicinity. If, however, the current is made to reverse the direction of its flow extremely frequently it will be unable to stimulate muscle or nerve, or to cause those chemical (electrolytic) changes in the tissues which cause blisters and ulcers. It can then be raised to an intensity which would in the case of other currents cause serious damage to the body, or even death, and the only sensation which it will produce is heat. Such a current is known as a "high-frequency" current. These currents had been used in medicine for many years before it was realised that their physiological and therapeutic properties were due to their power of heating the tissues. The older forms of high-frequency apparatus generated weak currents, and the heat produced was slight and generally imperceptible. The modern form of diathermy machine gives a high-frequency current of 3, 4 or 5 ampères. A current of this strength can readily raise the temperature of the whole body, and if it is concentrated on small areas it can heat the tissues to a degree which destroys their vitality, coagulating them *en masse*. The original form of high-frequency machine generated a current of half an ampère.

It had always been a puzzle to explain why high-frequency currents could not stimulate muscle or nerve. In the light of modern research on the excitability of these tissues the reason becomes more evident. The power of a current to stimulate the excitable tissues depends not only on the *strength* of the current but also on the *duration of its flow*. When the duration of its flow becomes very short the current must be made stronger. The shorter the duration the stronger must the current be made, till a critical period is reached when the current will fail, whatever its strength may be, to stimulate the tissues. The high-frequency current flows for less than this critical period of time in one direction before it reverses. It is therefore unable to stimulate any of the excitable tissues which it traverses.

How the Diathermy Current is Generated.

If a current is to heat the tissues appreciably it must attain a strength of at least one ampère, and if it is not to stimulate muscle or nerve it must alternate at least half a million times a second. No mechanical device is capable of procuring such an enormously high frequency of alternation. The current is obtained on an entirely different principle. If a condenser, such as a Leyden jar, is charged and the coats then connected by a wire it will discharge, and a current of momentary duration will pass along the wire. If the latter is bent into the form of a spiral the current will, during its momentary period of flow, alternate with high frequency between the coats. Some method of charging the condenser again after it discharges is required. In the original forms of high-frequency apparatus a large induction coil was used. A coil cannot, however, charge up the condenser again immediately after the latter is discharged. There are, consequently, periods of delay between the discharges, and each period of delay is relatively very much longer than the time the condenser takes to discharge. The result is that each group of high-frequency alternations accompanying each discharge is separated from the next group by a relatively long period during which no current is passing. In other words, the high-frequency alternations are not sustained, and the current is therefore unable to heat the tissues appreciably. The diathermy apparatus generates high-frequency currents on the same principle, but its design is modified and the high-frequency alternations are sustained so that a larger supply of energy, in the form of heat, is supplied to the body.

Sensation accompanying Passage of Diathermy Current through Body.

If two wires connected to a diathermy machine are brought close together a torrent of thick, dazzling white sparks darts across the gap. If two handles connected to these wires are grasped in the hands nothing at all is felt at first. Soon a sensation of warmth is perceived. It is felt first in the wrists and then it appears to creep up the forearms and arms. Gradually the rest of the body feels hotter. The arms are heated *directly* by the current, and the trunk and lower limbs are heated *indirectly* by the blood which circulates along the arms, and is thus heated in its passage through the latter. The temperature of the body gradually rises, and may reach 103° F. or higher. Other parts of the body can be heated directly. Joints can be heated through by placing electrodes on opposite sides. The temperature of the brain can be raised by passing the diathermy current through it by way of electrodes placed on the forehead and the neck. Experiments have been made on animals to demonstrate the rise of temperature in the depths of the tissues. A thermometer placed in the lateral ventricle of a dog's brain will show a rise of temperature when the diathermy current is passed between electrodes placed on the exterior of the skull. In the human subject the temperature of the pelvic organs can be raised when the diathermy current is directed through the pelvis by means of electrodes placed on the suprapubic and sacral regions. A thermometer placed in the posterior fornix will indicate the rise of temperature.

(*To be continued.*)

Subcutaneous Emphysema after Intubation.—Mlle. le Soudier records a fatal case in a boy, aged 3 years, suffering from laryngeal diphtheria. Intubation was difficult, and the tube had to be removed next morning when subcutaneous emphysema of the suprasternal fossa was observed. The emphysema extended during the day to the whole of the lower cervical region, and next day down to the iliac crest. Death took place on this day. In addition to vesicular and interstitial emphysema, an area of broncho-pneumonia was found at the base of each lung. There was no ulceration of the larynx. Only two other cases of surgical emphysema following intubation are on record; in both the patient recovered.—*Brit. Journ. of Children's Diseases*, vol. xv, p. 229.

FUNCTIONAL SPASM OF THE ŒSOPHAGUS.

By DAN McKENZIE,

Surgeon, Central London Throat and Ear Hospital, and Oto-Laryngologist to the French Hospital, London.

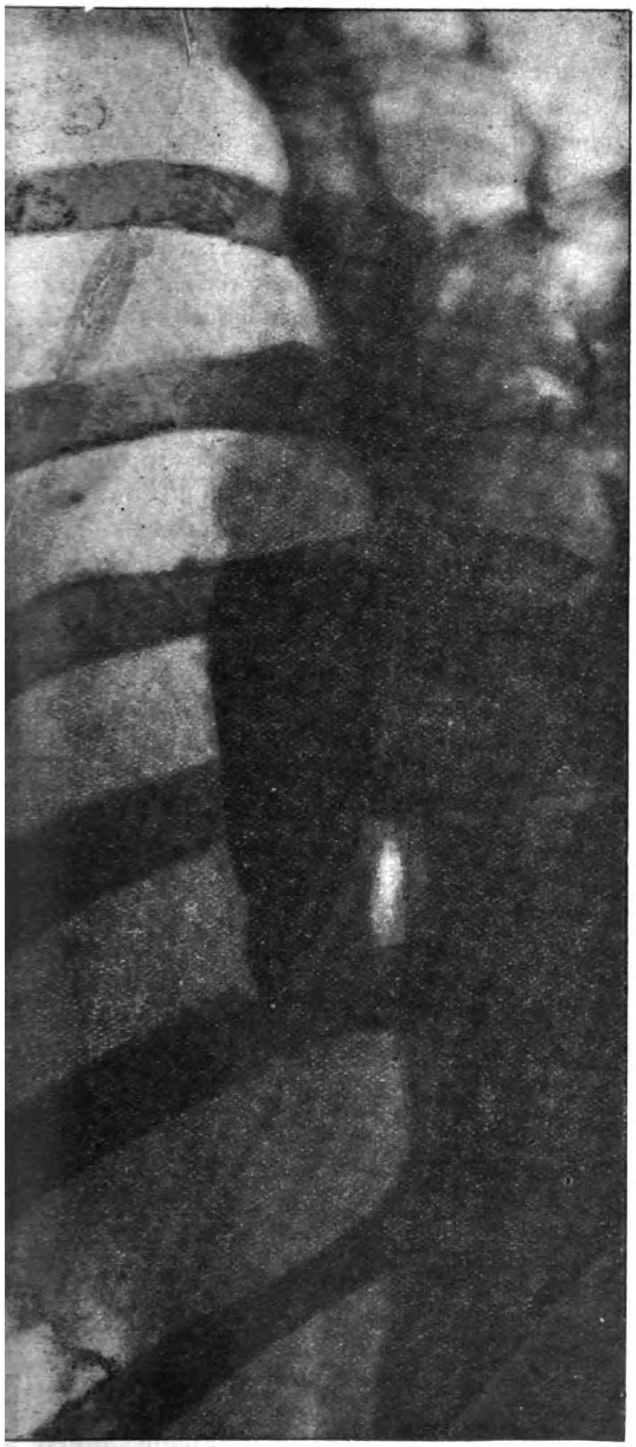
THE modern direct examination by the œsophagoscope along with the results of X-ray examination has now placed our knowledge of spasm of the œsophagus upon a sure footing. To begin with, it must be remembered that as with the urethra and the pylorus, so with the œsophagus, what seems to be a purely functional spasm often proves in the long run to have been a spasm set up reflexly from some organic lesion in the canal. But that pure functional spasm does occur there is no doubt Three types are recognised.

The first of these, spasm at the cardia, or achalasia of the cardia, as it is called, the gastric end of the gullet, is the most interesting and perhaps the most important form. Animal experiment and clinical observations show that it is due to vagus paralysis or paresis. Its importance lies in the fact that it may last for years, and that it then induces a relatively enormous dilatation, or bagging of the œsophagus above it.

The second type is met with *in mid-thorax*. Its character is illustrated in the accompanying skiagram (taken by Dr. Robert Knox), which is, I believe, the first skiagram ever exhibited of œsophageal spasmodic stricture in mid-thorax. The dilatation of the œsophagus above the stricture, if it can be said to exist at all, is very much less than we find in spasm at the cardia.

The third type is one to which I have recently drawn attention as being occasionally visible through the œsophagoscope. It is located *behind the cricoid*, that is to say, in the muscular sphincter which guards the upper entrance into the œsophagus. In the cases I have seen, the lumen of the canal at this spot was reduced to a small circular orifice of from 3 to 5 mm. in diameter, and had the appearance as if a thread were tied under the mucosa.

The symptoms in all three types are alike. There is constant difficulty in swallowing, with occasional attacks of absolute arrest of solid food, and sometimes even of liquids. The arrest is



Skiagram taken during phase of active spasm. Bismuth mixture arrested at level of the seventh rib.

usually due to the impaction of a large piece of food; an uncrushed tabloid or a pill may be sufficient to block the passage. And relief is not obtained until the obstructing bolus is dislodged—usually upward.

The condition may last for years: one of my patients with cardiospasm has been affected for 16 years; another with post-cricoid spasmodic stricture for upwards of 20 years And the constant struggle to get down sufficient nourishment is hard and anxious. All show serious emaciation.

Yet the treatment is not difficult, since the passage of a bougie, particularly amid all the impressive surroundings attendant upon a direct examination of the œsophagus, is sufficient to cure the spasm and to restore the normal function of the œsophagus. The treatment may need repetition, as the condition is liable to recur at intervals.

To this hopeful expression there is, however, a qualification. In long-standing spasm at the cardia secondary changes set up may render the cure by bougie-dilatation slow and uncertain. It is, moreover, difficult, as one cannot easily guide the point of the bougie through the greatly dilated œsophagus into the small cardiac orifice.

It is necessary, perhaps, to add that no attempt should be made on the part of the inexpert to pass a bougie blindly down the œsophagus in a case of what may seem to be spasmodic stricture.

To begin with, the spasm may be only the outward indication of an organic lesion such as a malignant growth. And in the second place the œsophageal wall is always easily penetrated, and the blind passage of a bougie may lead it into the mediastinum—an accident which invariably leads to death from septic mediastinitis.

Only after a full consideration of the symptoms, with an X-ray examination, is it permissible to pass an œsophageal bougie, and even then it should only be done under the guidance of the œsophagoscope.

Kondoléon's Operation for Elephantiasis.—W. E. Sistrunk has obtained good results from this operation at the Mayo Clinic. The aim is to establish, by a wide excision of the aponeurosis, a communication between the superficial and deep lymphatic channels. The deep aponeurosis seems to separate the superficial from the deep group of lymphatics. In elephantiasis the œdematous and hypertrophied tissues lie above the aponeurosis, while the subaponeurotic tissues are usually normal. When large pieces of this tissue are removed, sufficient communication may be established to allow the deeper lymphatics and the muscles to drain the stagnant lymph ordinarily drained by the blocked superficial group, and this markedly benefits the condition. The technique is as follows:

Long incisions are made along the outer and inner aspects of the affected limb, and through each of these a large slice of œdematous fat is removed. The aponeurosis is then opened, and a portion, 3 or 4 fingers wide, is excised throughout the entire length of the skin incision. The wound is then closed without drainage, so that the skin, with a small amount of subcutaneous fat attached to it, comes in contact with the exposed muscles.

The operation has been performed in the Mayo Clinic in 7 cases. In 3 the disease was located in the left arm, and in the other 4 in one lower limb. In the first arm case elephantiasis had followed an infected vaccination wound, with repeated erysipelatous attacks. In the next case a simple lymph-œdema of the arm followed the radical removal elsewhere of the left breast and axillary glands for a supposed malignant tumour of the breast, but which was afterwards proved to be benign. In the third arm case an elephantoid condition had resulted from an injury to the arm two years previously.

In one of the leg cases, in a woman, æt. 23 years, the condition was probably congenital, having been first noticed at 1½ years. In another case a child had chronic tuberculous synovitis of the knee and tuberculosis of the inguinal lymph-nodes on the affected side.

The results in the arm cases were not so good as in the leg cases. In each case improvement was marked soon after the operation, but in two instances the patients still report some swelling, which varies in extent. In the vaccination case the arm and forearm have returned to normal, but a swelling of a fluctuating type persists on the dorsal surface of the hand.

In all the leg cases the improvement was striking, and occurred almost immediately after operation. In the first, operation was performed 1½ years ago; the others, 8 months, 4 months, and 2 months ago, respectively. All were heard from or seen during April or May, 1918, and in each the improvement has been marked and has persisted.

In his first cases Sistrunk followed closely the technique by Kondoléon. He gradually realised that better results were obtained when a fair amount of hypertrophied skin was removed in addition to an extensive removal of the œdematous fat, and that it was necessary, in order to obtain the best results, to remove, as Kondoléon has emphasised, a wide strip of aponeurosis.

A long, modified elliptic incision, which includes the skin to be sacrificed, is made on one side of the affected limb. On the outer aspect of one of the lower extremities this incision would extend from the trochanter to the external malleolus. Then, in order to facilitate wide removal of the subcutaneous fat, the skin is reflected on each side of the incision for a distance of 1 to 1½ in. The skin is retracted, and underneath each of the reflected skin edges a long incision is made through the œdematous subcutaneous fat down to and including the aponeurosis. These incisions are made almost parallel to the original skin incision. Included between them is a quadrilateral piece of œdematous fat and aponeurosis. At the upper end these two incisions through the aponeurosis are connected by a transverse incision. The tissues to be removed are now free except for the attachment of the aponeurosis to the underlying muscles. By traction on the tissues that are to be removed, it is easy to dissect the aponeurosis from the muscle throughout the length of the entire limb, and to remove in one long piece the skin, œdematous fat and aponeurosis. A number of vessels which tend to bleed profusely are encountered. These are temporarily controlled with forceps. The wound is closed with interrupted silkworm gut sutures, without drainage. It is necessary to do a similar operation on the opposite side of the limb. If the patient's condition permits, this is done as soon as the first operation has been completed: if not, after 8 or 10 days. The tissues, although diseased, heal remarkably well.

After operation an elastic bandage is applied when the patient gets about.—*Journ. Amer. Med. Assoc.*, p. 800.

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Editorial correspondence should be addressed to the Editor, 18, *Brownswood Park, London, N.* 4; *business communications to the Publishers*, 23, *Bartholomew Close, London, E.C.* 1. *Telephone, City* 956.

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A CASE OF LETHARGIC (EPIDEMIC) ENCEPHALITIS WITH ABSCESS-FORMATION IN THE BRAIN; SOME OTHER CASES FOR COMPARISON, AND REMARKS ON ENCEPHALITIS.

By F. PARKES WEBER, M.D., F.R.C.P.,

WITH A PATHOLOGICAL REPORT ON THE ABSCESS CASE.

By S. A. KINNIER WILSON, M.D., F.R.C.P.

THE patient, A. L. A—, æt. 48 years, was first seen by Dr. Weber on June 16th, 1918. He was then in a drowsy condition, from which he could only with difficulty be roused, and could hardly understand what was said to him. No ocular, facial, or other paralyses were at that time noted. The history was that the lethargic condition commenced on June 13th, but that he had been vomiting on and off since June 10th. Five weeks previously he had had cough and bloody expectoration, suggesting the presence of pulmonary tuberculosis.

He was admitted to hospital on the same day on which Dr. Weber first saw him—on June 16th. The lethargy persisted. If left to himself he would remain still in bed, except that he would sometimes draw his knees up and push the bedclothes off. He would sometimes put up his hand to keep the spoon or feeding-bottle off, and would similarly resent ophthalmoscopic examination. He passed urine and fæces under him into the bed. There was no fever; the pulse at first was 76 to 88 per minute, and the respiration was easy and quiet, about 24 per minute. The urine (on June 17th) was of specific gravity 1022, acid, containing a trace of albumen and a few erythrocytes and hyaline tube-casts; it gave negative reactions for

sugar, acetone and diacetic acid. Dr. C. Markus, who examined the patient's eyes, reported that the optic discs were hyperæmic, but that there was nothing decidedly pathological to be made out by ophthalmoscopic examination. There was no paralysis of the external eye muscles nor ptosis on either side. The pupils reacted slightly to light. No knee-jerks or ankle-clonus could be obtained. About June 18th there seemed to be slight facial paresis on the right side.

Urotropin in doses of 15 gr. thrice daily was given, and feeding with a nasal tube was resorted to, but the patient died, apparently by cardiac syncope, on June 20th. During the last days the pulse was increased in frequency (up to 126 per minute at the end), but the highest temperature noticed in the hospital was only 99·2° F. The blood-serum was found to give a negative Wassermann reaction.

At the *necropsy* (on June 21st) nothing special in the thoracic or abdominal viscera was found. The heart weighed 8½ oz.; the spleen weighed 4 oz. and was very soft; the kidneys together weighed 8 oz.; the liver weighed only 38 oz. Examination of the brain, including the medulla oblongata, showed no evidence of tuberculous meningitis. There was an extensive area of softening in the left cerebral hemisphere, including what seemed to be an abscess-cavity containing greenish, pus-like matter. The cavity in question occupied the anterior portion of the occipital and the posterior portion of the temporal lobe; it was of rounded, ovoid shape, extending forwards 7 cm., and measuring about 4 cm. across. There were no signs of atheroma in the arteries at the base of the brain. There was no disease of the skull or dura mater. The spinal cord was not examined.

Pathological Report (by Dr. S. A. Kinnier Wilson).

For microscopical purposes small pieces of brain-tissue, including the overlying meninges, were taken from the immediate neighbourhood of the abscess-cavity, and also from the left frontal and Rolandic areas. Further, pieces were examined that included the ependyma of the ventricular system.

It was apparent to the naked eye, but much more noticeable microscopically, that round the abscess-formation intense congestion of the blood-vessels and capillaries was everywhere present; some of the latter, in places in the zone of congestion, showed either permeability of their walls or actual rupture. In any case, what resulted was the occurrence of small capillary hæmorrhages into the surrounding brain-tissue, but these were not noted anywhere to be massed or confluent. In areas away from the abscess-zone similar, if less severe, congestion of capillaries and small blood-vessels was found. A striking feature of the vessels, apart from their distension, was the remarkable degree of small-cell infiltration in their perivascular lymphatic sheaths. These were filled to their limits, one may suppose, with a mixed cellular infiltrate, sometimes so marked as to obscure almost completely the small vessel in their centre. In the case of the capillaries and small veins the infiltrate was almost entirely lymphocytic, and mainly so in the case of the smaller arteries; in some of the larger, however, plasma-cells in considerable number and polymorphs were seen mingled with the lymphocytes. The small-cell collections, moreover, were irregular in their distribution in two respects: while some vessels in the abscess-zone had reached the maximum of cellular infiltration in their sheaths, others showed little or nothing of this; and, secondly, not a few of the larger vessels had the cells massed at one or other sector of their circumference, while the remainder of the sheaths were empty. It may be noted that in many instances the endothelial lining and nuclei of the capillaries and smaller vessels were swollen; also that there was evidence of endothelial proliferation and of endothelial cells taking on a wandering *rôle*.

In cortical areas remote from the main lesion similar cell-infiltrates were to be seen, though less in degree on the whole. So also in the vessels of the meninges such lymphocytic and mixed-cell collections were here and there discoverable, but they were of smaller dimensions, and curiously patchy in their distribution. Relatively few small cells were free in the meninges, either on the cortical surface or in the meningeal septa between adjacent gyri. The more or less cuboidal ependymal cells showed no changes beyond slight swelling in places.

As for the abscess-cavity itself, no "wall," in the ordinary sense, surrounded it, but while its centre showed the usual characters of disintegrating

and necrotic tissue, leading in places to amorphous and granular *débris*, its outer limits were constituted by a zone compounded of immense numbers of polymorphs, many apparently fresh, others obviously degenerating, interlarded with compound granular corpuscles in a state of activity. Outside the polymorph masses were the vascular congestion and hæmorrhagic areas already mentioned. Careful search with suitable stains failed to reveal any bacterial or organismal element either in the cavity or in its vicinity.

As striking as the vascular phenomena was the glial reaction in the neighbourhood of the main lesion; traces of a similar change, but to nothing like the same extent, were noted in sections remote from the lesion. The reaction consisted in a marked overgrowth of glial nuclei of the usual small round type, which were found in long "strings" or rows on the thread-like glial septa in the interstices of the subcortical nerve-parenchyma. These rows of glial nuclei gave the sections quite a peculiar appearance. So close were the nuclei that they were frequently in actual contact one with another, but there was no corresponding overgrowth of glial fibres. No large glial cells with abundant cytoplasm were anywhere found.

The nerve parenchyma did not show much sign of pathological change. Only in the areas round the abscess-cavity was the white matter somewhat swollen, and in part, of course, destroyed. Elsewhere it was normal. The nerve-cells of the cortex did not reveal any constant change, except where the cortex was invaded by the abscess. No trace of actual neuronophagia was discovered, nor evidence of parasite glial cells or nuclei round the cortical nerve-cells.

From a negative point of view, further, it may be stated that endarteritis of the syphilitic type was conspicuous by its absence, and that no sign of tuberculosis was present in any of the many sections examined. There was, finally, nothing histologically to suggest a general invasion of the meninges.

Other Cases for Comparison, with Remarks on Encephalitis (by Dr. Weber).

With the case of A. L. A— may be contrasted the following case, apparently likewise one of fatal lethargic encephalitis, though associated with convulsive attacks and occurring somewhat before the onset of the main epidemic. The patient, N. S—, æt. 17 years, a Russian-Hebrew boy, was first seen by Dr. Weber on March 19th, 1918, in consultation with Dr. M. W. Cohen. The history was that the boy had been apathetic and drowsy and had been in bed since March 14th. The illness commenced with headache and drowsiness shortly after an air-raid on the night of March 7th, but before then he had been suffering from slight "indigestion." Since March 18th clonic spasms of the left side of the face had been observed, and during the night of March 18th to 19th he had had 3 epileptiform attacks. Though in a somewhat lethargic condition he could be roused to sit up in bed or even to stand up, and could to some extent answer questions put to him. The knee-jerks were excessive; no ankle clonus was obtained; the plantar reflexes were of the normal flexor type. The axillary temperature (at 11 a.m.) was 100° F.

He was taken to hospital on the evening of the same day (March 19th), and arrived in a condition resembling *status epilepticus*, with recurring epileptiform convulsions; between the convulsive seizures he was practically unconscious. His temperature was 101° F.; the pulse was 108, and the respirations 44 per minute. Some chloral hydrate was given by the rectum, but the patient died, only one and a half hours after his admission, during the sixth attack of epileptiform convulsions which he had had since reaching the hospital. At the necropsy, by somewhat hurried examination of the brain and thoracic and abdominal viscera nothing special was found, excepting œdema of the lungs. No tuberculous meningitis nor any gross (macroscopic) disease of the brain was discovered. Unfortunately, no microscopical examination was made. A specimen of urine, obtained post-mortem from the bladder, was free from sugar, but showed a "cloud" of albumen.

With the preceding two cases may be compared the following *typical and relatively mild example* of lethargic encephalitis in a child. The patient, A. G—, æt. 2½ years, a well-developed little girl of English parentage, was admitted to hospital under Dr. Weber, on May 6th, 1918, in a condition of lethargy or drowsiness, varying considerably in degree from time to time. Sometimes it was very great, and the child passed urine under her,

Sometimes the sleep appeared almost normal, and she could be easily roused, and then she could eat in the ordinary way, and would even talk about her toys and about going home to see her father and mother; but at her best she seemed tired, and sometimes yawned like a normal sleepy child. When left to herself she immediately relapsed into sleep again. During the first 3 days in the hospital there was moderate fever (100°–103·2° F.), but after the evening of May 8th the temperature seldom reached 100° F. There was well-marked bilateral ptosis, together with left facial paresis and alternating divergent strabismus. At first there was diplopia, for the child would usually grasp at a false image of the object situated to the left of the real object when the real object was on the child's left, and to the right of the real object when it was on the child's right. There was no optic neuritis and there was no nystagmus. There was never any cervical rigidity.

According to the parents, the lethargic condition developed suddenly on May 2nd, after a slight "cold," and immediately after the examination of her throat by a doctor for enlarged tonsils and adenoid vegetations—an examination which seemed to have frightened her very much.

On May 14th the child appeared decidedly less drowsy, and on May 15th she was sitting up in bed and talking, and taking an interest in her doll and in her fellow-patients in the ward. Though the general and mental condition soon became excellent, the ptosis, divergent strabismus and left facial paresis were still present during the middle of June. On July 10th, however, when the child left the hospital, I noted that there was no longer any ptosis, and only the slightest remnant of the left facial paresis could be detected. Divergent strabismus of the right eye was, however, still present in December, 1918, and is doubtless a permanent paralytic result of the disease.

Remarks on Encephalitis.

In regard to the differential diagnosis of cases of ethargic encephalitis the following conditions may come into consideration:

(1) *Psychoses, characterised by lethargy, stupor, a state of "catalepsia cerea" ("plastic" catalepsy), etc.*—The question of psychoses might arise in cases in which there is a history of mental shock, especially in cases of adults with little or no fever. In several cases of the recent epidemic there was a history of fright or mental shock owing to air-raids, etc. It seems possible that some cases classed as catalepsy in the past may really have been sporadic examples of lethargic encephalitis.

(2) *Tuberculous meningitis, in the case of adults or children.*—This disease has had to be thought of in several cases during the recent epidemic, and various mistakes in diagnosis between the two conditions have been recorded.

(3) *Early syphilitic acute meningo-encephalitis and syphilitic disease of the cerebral blood-vessels.*—These may have to be considered, especially in the case of young adults, and the Wassermann reaction both with the blood-serum and with the cerebrospinal fluid may prove very helpful in the diagnosis.*

(4) *Botulism, due to the Bacillus botulinus.*—Some of the early cases of the recent epidemic, on account of the paralyses of eye muscles or face, were at first thought to be examples of true botulism, after the papers on the subject by Wilfred Harris† and A. J. Hall,‡ but in no case was the presence of the *Bacillus botulinus* detected, and no true cases of botulism were recorded at the time in England.

(5) *The polio-encephalitis of the "Heine-Medin disease."*—The arguments against regarding lethargic encephalitis as a form of the Heine-Medin disease (as maintained by F. G. Crookshank) have been admirably summarised in England by Kinnier Wilson,§ by E. F. Buzzard,‖ and by F. E. Batten and G. F. Still¶; and their views are, I understand, in accordance with those of Prof. Arnold Netter and other observers in France. The

* *Cf.* F. Parkes Weber, "Syphilitic Thrombosis of the Basilar Artery of the Brain, with Remarks on Syphilitic Basal Leptomeningitis," CLINICAL JOURNAL, London, 1916, vol. xlv, pp. 405–411.

† Wilfred Harris, "Acute Infective Ophthalmoplegia, or Botulism," 'Lancet,' 1918, vol. i, p. 568.

‡ A. J. Hall, "Note on an Epidemic of Toxic Ophthalmoplegia," *ibid.*, 1918, vol. i, p. 568.

§ S. A. Kinnier Wilson, "Epidemic Encephalitis," *ibid.*, 1918, vol. ii, p. 7.

‖ E. F. Buzzard, paper on "Lethargic Encephalitis," read before the Medical Society of London on December 9th, 1918, *ibid.*, London, 1918, vol. ii, p. 835.

¶ Batten and Still, "Epidemic Stupor in Children," *ibid.*, 1918, vol. i, p. 636.

epidemiological data collected by S. P. James* are likewise of some importance in this respect.

(6) *Cerebral hæmorrhage and cerebral thrombosis.*—Muscular twitchings in the face and limbs may suggest an irritative lesion such as a progressive hæmorrhage in the brain. There are certain "apoplectiform" cases of epidemic (lethargic) encephalitis simulating cerebral hæmorrhage or extensive cerebral thrombosis, and at post-mortem examinations large areas of softening and gross hæmorrhages have occasionally been found.†

(7) *Status epilepticus.*—The question of *status epilepticus* as a diagnosis occurred in the above-described case of N. S—.

(8) *Uræmia.*—This had been suggested as a possible diagnosis in the fatal case of a man, D. O—, æt. 58 years, whom I saw in consultation on August 16th, 1918. In his case the lethargic condition was associated with constant muscular twitchings in the limbs. At an earlier period of the disease it had, I believe, also been suggested that the symptoms were due to fæcal absorption.

(9) *There are other kinds of encephalitis* which may be connected with influenza, traumatism, etc. Thus, for instance, in 1900 E. Stadelmann recorded a case of hæmorrhagic encephalitis after influenza in which the symptoms resembled those of cerebral hæmorrhage.‡ I have also notes of the case of a boy, F. M—, æt. 2½ years, who fell out of a perambulator on to his head, after which (during the same day) symptoms such as vomiting commenced. Three days later he was admitted to hospital in a drowsy condition, with some rigidity of the neck. Ophthalmoscopic examination showed nothing abnormal. A few days later the child was comatose and there was complete flaccid paralysis of the left limbs. The paralysed limbs became spastic on the next day. There were recurrent fits of dyspnœa, accompanied by dilatation of both pupils and tetanic movements of th e left arm. The child died on the eleventh day after the supposed injury. The post-mortem examination, as I was told, showed a hæmorrhage and a softened area of brain-tissue involving the right internal capsule. There was no fracture of the skull nor any lesion on the outside of the brain. The softened brain-tissue around the hæmorrhage was examined microscopically for evidence of tumour, with negative result. The case might perhaps have been one of traumatic *inflammation* of the brain.

In a young man, W. S—, æt. 21 years (under the care of my colleague, the late Dr. Port), suffering from tuberculosis of the lungs and bronchial glands, fatal cerebral symptoms developed, and at the post-mortem examination it was found that there was red coloration of the substance of the pons Varolii. Microscopic sections of this portion of the brain showed capillary hæmorrhages and a little cell-infiltration—in fact there was acute hæmorrhagic encephalitis of the pons Varolii. No tuberculous meningitis was noted.

With this last case, one described by Sigurd Berg,* of Stockholm, may be compared. The patient was a young woman, æt. 24 years, who suddenly developed spastic paralysis of the left limbs, together with facial paralysis on the right side, and severe cerebral symptoms. The post-mortem examination proved the case to be one of acute hæmorrhagic encephalitis of the pons Varolii with gross hæmorrhage, but the ætiology of the encephalitis was not clear. In the case of a boy, æt. 11 years, described by J. Collins and R. G. Armour† (of New York), acute fatal bulbar paralysis followed an attack of mumps. The necropsy and microscopical examination showed that there were foci of polio-encephalitis scattered irregularly through the pons Varolii and medulla oblongata.

* S. P. James, "Lethargic Encephalitis—its Distribution in England," *ibid.*, 1918, vol. ii, p. 837. See also his contribution to the "Discussion on Epidemic Encephalitis," *Proc. Roy. Soc. Med.*, 1918-19, vol. xii, pp. viii–xi.

† *Cf.* C. R. Box, 'Lancet,' 1918, vol. ii, p. 723; also E. F. Buzzard's paper before the Medical Society of London, *loc. cit.*

‡ E. Stadelmann, 'Deut. Zeitschr. f. Nervenheilkunde,' 1900, xviii, p. 118. *Cf.* also an earlier paper on "Influenza and Encephalitis," by Prof. Nauwerck, 'Deut. med. Wochens.,' 1895, xxi, p. 393.

* Berg, 'Deut. Zeitschr. f. Nervenheilkunde,' Leipzig, 1914, li, p. 92.

† Collins and Armour, 'Review of Neurology and Psychiatry,' Edinburgh, 1912, vol. x, p. 361.

DIATHERMY.

By E. P. CUMBERBATCH, B.M.Oxon., M.A., M.R.C.P.,

Medical Officer in Charge of the Electrical Department, St. Bartholomew's Hospital, etc.

(*Continued from p.* 10.)

In the last number of the CLINICAL JOURNAL the form of treatment known as "diathermy" was described. The use of diathermy for surgical purposes will now be considered. Diathermy is used in surgery for the destruction of unnecessary tissue, particularly new-growths, both malignant and innocent. The destruction is brought about by *heat*. The heat is generated *on and within* the tissues themselves so that the latter are coagulated *en masse*. In other methods of cautery by heat, the heat is produced in a metal wire or blade and transferred to the tissues. The latter are burnt to a cinder just where the metal makes contact with them, but the destruction spreads for a very short distance because the tissues conduct heat very badly.

The use of diathermy in the treatment of malignant growths will first be considered.

Cases suitable for Treatment by Diathermy.

If a growth is to be treated by diathermy it must be accessible—that is to say, within reach of the electrode, because the latter must be placed in contact with it. Growths of the skin and of the mucous membranes of the nose, mouth, pharynx, tongue, larynx, œsophagus, rectum, bladder and cervix uteri can be treated. In the second place, if the growth has infiltrated into parts which could not be destroyed without danger, it is unsuitable for diathermic cautery—at any rate, with the hope of complete removal. Diathermy is no respecter of tissues, and if a growth of, say, the floor of the mouth has infiltrated into the skin of the submaxillary region and into the jaw, an attempt at complete destruction would do more harm than good. Growths which have infiltrated less far but are too advanced for any cutting operation have formed the bulk of those treated during the past 8 years at St. Bartholomew's. The results which have been obtained will be described later. The less widespread the growth, the better the result, till finally we come to the cases in which diathermy would compete with the knife. Few of these have come under my observation; but the quickness of the operation by diathermy, the absence of bleeding, the freedom from shock and the very short stay in hospital render desirable an extended trial of the newer method for growths which are surgically operable. In the present article the treatment of inoperable growths will be considered.

Description of Diathermic Cautery.

Suppose that a malignant ulcer of the tongue is to be treated by diathermy. Two electrodes are required. One, the *indifferent* electrode, is a large metal plate, say 6 in. by 4 in. It is placed on some distant part of the body such as the chest or abdomen, with a pad of lint, 7 in. by 5 in., wrung out of strong salt solution, intervening. The active electrode is very much smaller—a metal disc $\frac{1}{8}$ or $\frac{1}{4}$ in. in diameter. It is placed on the ulcer. The current is passed between these electrodes. It will be evident that the *density* of the current will be low in the region of the *indifferent* electrode, and will increase when the *active* electrode is approached, till it attains its highest value when the latter electrode is reached. Consequently the tissues in the region of the *indifferent* electrode will be heated scarcely at all, while those at and a little way under the *active* electrode will be heated strongly enough to cause their coagulation. Before performing the operation an anæsthetic must be given. If the tissue to be destroyed is small in amount and easily accessible, the anæsthetic may be local; otherwise it must be general. The active electrode is placed on the base of the ulcer, and the current is gradually increased. The tissue under the active electrode soon whitens from coagulation. Bubbles of steam escape, and if the current is allowed to flow longer the coagulated tissue dries. It does not then conduct the current, except in the form of sparks which bridge over the dried tissue. Before sparking takes place, the current should be stopped and the electrode placed on an adjoining part of the ulcer. The current is again switched on, and the process repeated till the base and edges of the ulcer and a small part of the surrounding healthy tissue have been coagulated. The *depth* to which the coagulation has extended depends on a number of factors, but it may be said to be equal, approximately, to the diameter of the active electrode. The

depth to which the growth has extended will determine the size of the active electrode. It is not advisable to scrape or cut away coagulated growth because bleeding is very likely to occur, and with it increased risks of dissemination of the growth. There is another way of treating a growth by diathermy, and it may be applied when the growth or ulcer is movable over underlying parts. The active electrode is a short, narrow blade. It is thrust into the healthy tissue immediately beyond the growth and the current is allowed to flow till the tissue around it coagulates. The blade is then advanced forwards, the current still flowing, so that it cuts only coagulated, bloodless tissue. In suitable cases the growth can be removed in this way with the loss of little or no blood. Fungating masses can be cut away, and then, if there is much infiltration, the base can be further coagulated by means of the disc electrode.

If the growth is in a less accessible region, such as the larynx, œsophagus, rectum or bladder, special electrodes are used.

Results of Diathermic Cauterisation of Malignant Growths.

The tissues in the region of the cautery quickly become œdematous, and an exudation of lymph, lasting sometimes for 24 hours, follows when diathermy is applied to growths of mucous membranes. The cauterised tissue sloughs away, and the residual cavity quickly fills with granulation tissue. Mucous membrane rapidly grows over. If the external surface of the body has been cauterised by diathermy, granulation tissue quickly fills the cavity, but the new epithelium grows over more slowly. The scars do not contract, nor do adhesions with adjacent parts follow.

Shock does not follow cauterisation by diathermy, and the patient is able to sit up the day after the operation, and on the third day is able to rise from bed, and even walk about the ward. A rise of temperature to 100° or 101° F. sometimes follows the operation, but it usually does not last for more than a day. The patient is able to take semi-solid food 2 or 3 days after the operation, even when there has been extensive cauterisation of the mouth or throat.

Complications seldom follow diathermic cauterisation. Secondary hæmorrhage has occurred after treatment of extensive carcinoma of the tongue. The hæmorrhage was no doubt due to coagulation of the wall of the lingual artery during the operation. If an artery or vein of a size larger than, say, a knitting-needle lies in the field of the operation, the blood will pass through it too quickly for its temperature to rise to coagulation point, while the wall of the artery, being fixed, will be destroyed. When secondary hæmorrhage occurs, it takes place when the slough separates. Sloughs should always be allowed to separate spontaneously, and no mechanical aid should be given, because, if arterial thrombosis has occurred, the thrombus might easily be detached. It is advisable to ligature the artery a few days before the operation if the growth is believed to have infiltrated into its neighbourhood.

Broncho-pneumonia occasionally follows diathermic cauterisation of growths of the mouth and throat, but less frequently than after cutting operations.

If bone is close to the site of the operation there is a risk of destruction of the periosteum. If this occurs the dead bone must separate, and this means a long delay in healing and risk of infection of the bone, and prolonged pain and suppuration. If bone has been destroyed it should be removed surgically as soon as possible.

Sepsis of the cauterised tissues or the glands draining the neighbourhood is very rare. Two instances only have come under the author's observation.

Subsequent Fate and Duration of Life.

Patients are usually relieved of the distressing symptoms of malignant growths by diathermy. Pain and discharge subside, and if the growth has not extended into regions which cannot be destroyed it may be made apparently to disappear, leaving no palpable or visible trace. Usually however, recrudescence occurs; the same treatment can, however, be repeated as soon as recrudescence is noted. Patients with malignant growths of the mouth or throat derive great benefit from the absence of pain, salivation, and expectoration. A man suffering from malignant growth of the tonsil, palate and fauces lived for 2 years and 9 months after the first application of diathermic cautery. The treatment was repeated on 6 occasions, and

he was free from pain and discomfort till the last 3 months of life. Another patient received treatment of a malignant ulcer of the tongue by diathermic cautery. Death eventually occurred 18 months later, but the tongue showed no visible or palpable signs of growth a few days before death. Other cases of inoperable malignant growth have lived for shorter periods—6 months, 9 months, or a year—but nearly all have been relieved of distressing symptoms. The quickness of the operation, the absence of shock and pyrexia, the short stay in bed and the small amount of discomfort render diathermic cauterisation a valuable method of treatment of inoperable malignant growths.*

Diathermy is an excellent method of treatment of many forms of non-malignant growth. For papilloma of the bladder it may be said to be the method *par excellence*. An irrigating cystoscope is passed and the bladder washed clean. The latter is then filled with water and a papilloma brought into view. A fine flexible wire, insulated except at its extreme tip, is connected to the source of the diathermy current and passed along a side channel of the cystoscope into the bladder till the tip touches the papilloma. The current is passed and the part in contact with the tip whitens from coagulation. The stalk of the papilloma and its base can thus be destroyed. If the papilloma has many branches which overlay and obscure the base it can be destroyed piecemeal. Papillomata treated by diathermy do not recur.

A case of fibroma of the nasopharynx, under care of Mr. Rose, was treated at St. Bartholomew's by diathermy. It was destroyed and did not reappear. The severe hæmorrhage that occurs when cases of this kind are treated by excision renders diathermy a most valuable form of treatment of these growths.

For large nævi which cannot be excised and fail to disappear under treatment by electrolysis diathermic cauterisation is often successful. A strong current is required for the coagulation by heat of the blood in cavernous nævi. The overlying skin or mucous membrane is destroyed at the same time, so that precautions against sepsis must be taken whenever possible. A large pulsating nævus of one side of the tongue and the floor of the mouth was one of the first three cases treated by diathermy in this country. The operation was performed by Nagelschmidt in the Electrical Department of St. Bartholomew's Hospital in October, 1910. The coagulated nævus sloughed away, leaving no visible trace. The patient was seen 4 years later. There was a new patch of nævus on the wall of the pharynx, but no trace was visible on the tongue or floor of the mouth. The new portion was treated by diathermy under local anæsthesia and made to disappear.

Warts, moles and papillomata of the skin or mucous membranes can be effectively destroyed by diathermy. A very quick method is the following: A mounted needle is used as the active electrode. The point is brought almost in contact with the part to be destroyed without actually touching it. A shower of sparks passes on to the growth and instantly cauterises and shrivels the part on which the sparks fall. Minute portions of tissue, say of the size of a hemp-seed, are destroyed when the needle is brought to sparking distance. The needle cannot be held for more than a moment in this position on account of the pain due to the heat. A less painful way of destroying small portions of tissue by sparks is to place the patient on a condenser couch and bring a needle or blunt-pointed electrode to a short distance from the growth till sparks pass. The electrode should be connected to earth and the operator must not touch the patient. The sparks are more readily tolerated and do not cause much pain, so that longer application can be made and growths of larger area readily destroyed. Large flat warts, moles, corns, telangiectases, flat nævi and senile warts can be most effectively destroyed by this method.

(*To be concluded.*)

* For a fuller account of diathermy, its production and its uses in surgery see 'Archives of Radiology and Electrotherapy (Archives of the Roentgen Ray),' July, 1914, and subsequent numbers. See also a paper read by the author before the Royal Society of Medicine in April, 1918 ('Proc. Roy. Soc. Med.,' Section of Electro-therapeutics, vol. xi, No. 9).

HÆMOPHILIA WITH EFFUSION INTO THE KNEE-JOINTS.

By PAUL BERNARD ROTH, F.R.C.S.,

Senior Surgeon, and with Charge of Orthopædic Cases, Kensington General Hospital; Surgeon, City of London Military Hospital.

A BELGIAN boy, æt. 6½ years, was admitted to hospital on January 26th, 1918, with greatly swollen knee-joints, his mother stating he was a hæmophiliac. The family history was negative. The patient was an only child. Except that previous to his birth she had one miscarriage at the fifth month, preceded by repeated severe hæmorrhages, and that when she has had teeth removed there has been considerable bleeding for several days after, the mother was quite healthy. Of the mother's relations, her two sisters were alive and well; both were married. One had two boys, the other a girl, all of whom were healthy. Her father died of old age at 70; he was not a bleeder. Her mother died at 60 of cancer of the stomach. Her two maternal uncles were alive and well, and were not bleeders.

History of case.—The patient was quite well until two years old, when he fell down and tore the upper lip at the frænum; it bled for 3 days, and had to be treated with the electric cautery. Soon after he bled from his tongue, also for 3 days. When 3 years old the right knee swelled up suddenly; after some time the swelling subsided. Since then the swelling has appeared and subsided repeatedly, and the knee has never been quite well. He also used to bruise very easily; thus the whole of his back or the whole of one arm from the elbow to the shoulder would become bruised. This tendency has not been noticed now for some time. When 6 years old his left knee suddenly swelled up and then subsided; it has done this several times since. Only 6 weeks ago (writing on February 22nd) he started to bleed profusely from the socket of a milk molar; the bleeding lasted for a week. It was always much worse at night.

On admission, he was seen to be an intelligent, fresh-complexioned, well-nourished boy with brown hair and eyes. His tonsils were hypertrophied, as large as cherries, blocking up his throat. His knees were enormously enlarged, especially the right, which was hot and glazed in appearance. A few days after admission he scratched his left index finger one afternoon, and next morning his shirt and bedclothes were covered with blood; the scratch bled for two days. The swelling of the left knee gradually disappeared, but that of the right has only slightly lessened. It is evident that part of the swelling of this knee is due to an enlargement of the bones and joint surfaces, as occurs in rheumatoid arthritis.

Radiograms of the right knee (Figs. 1 and 2) by Dr. W. Ironside Bruce show extensive wearing away and absorption of the cartilage and bone of the articular surfaces of the femur, tibia and patella; in addition there is to be noticed the formation or building up of new bone at the edges, that is, lipping, and a dark shadow surrounding and enveloping the bones—an appearance evidently due to distension of the synovial cavity with blood. These appearances taken together, and with the age of the patient, are unlike those in any other condition, and it is suggested that they are pathognomonic of hæmophilia.

Remarks.—Though hæmophilia is defined as "an inherited tendency in males to bleed" (Bulloch and Fildes), there can be little doubt that this is a true case of the condition in spite of the negative family history; and when shown at the Royal Society of Medicine* it was accepted as such. It is possible that this boy had ancestors who did bleed unduly, or that he forms the starting-point of a new hæmophilic stock.

The nature of the joint effusions in these cases is not yet definitely decided. In this particular case, when the radiogram was taken, the swelling was certainly due to blood, hence the shadow. Some writers state the effusion is not due to blood, but serum; some that it consists of mixed blood and serum; and others, again, insist that in every case the effusion consists of blood alone. To clear this matter up in any case, there would be no objection to puncturing the distended joint with a fine exploring needle, and drawing off some of the fluid for examination; the elasticity of the tissues prevents any hæmorrhage occurring at the site of the puncture.

Time of the bleeding.—The mother mentioned that several times when the child bled the bleeding was worse at night—an observation which has been

* Before the Section for the Study of Disease in Children, February 23rd, 1918.

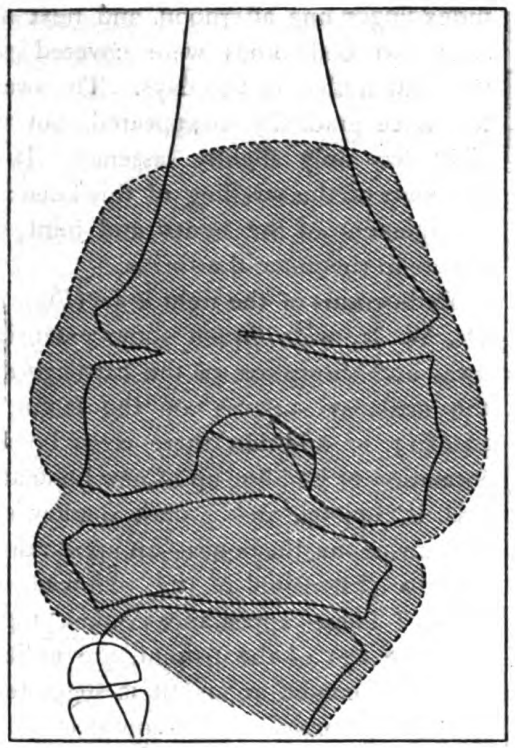

FIG. 1.

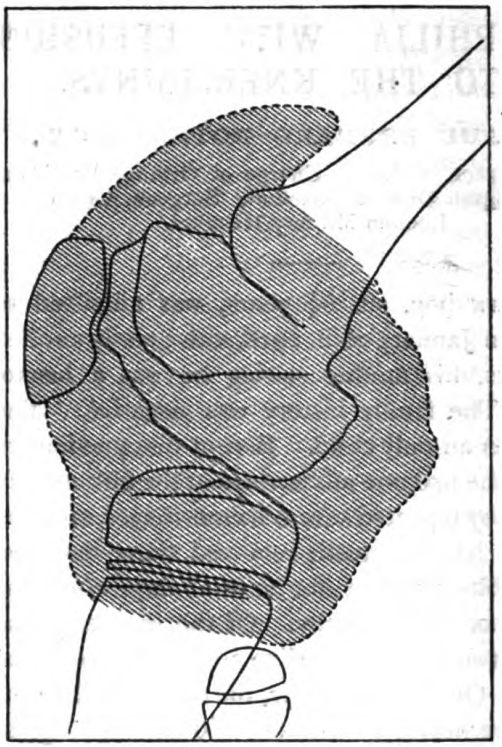

FIG. 2.

Illustrations by courtesy of 'The British Journal of Children's Diseases.'

noted by many writers on hæmophilia. During one attack the child had in hospital the bleeding certainly appeared to be worse at night.

The diagnosis.—When first seen by another this case was, without a proper examination, diagnosed as tuberculous knee, and in the literature cases are described as having been diagnosed as acute tuberculosis, even by good observers, and some have been operated on in consequence and have died. According to Dr. Wickham Legg,* "the diagnosis depends upon the circumstance of the swelling occurring in a person already known to be the subject of hæmophilia." In the present case the mother arrived with the patient and said he was a hæmophiliac, and in such an event the confirmation, when the idea is present, becomes easy; but if there were any doubt the X-ray examination would clear it up.

As to prognosis, the chief feature in this case, from a surgical point of view, is the damage to the knee-joints, which are certain to become more or less disabled. At present the right knee can be flexed to a right angle, but can only be extended to an angle of 150°, while the left knee still has a complete range of movement. In time, as attack follows attack, the osteo-arthritic changes will become still more marked, the knees will get stiffer, and the range of movement less. The treatment adopted should therefore attempt to lessen the number and severity of these attacks by limiting the chance of excessive movement. This can be done by applying knee-cages, as made by Critchley & Sons,* arranged so as to allow only a small amount of extension or flexion. The outlook as to possibility of cure is pretty hopeless. It is doubtful if a person once the subject of hæmophilia ever grows out of it; but as he grows older the attacks of hæmorrhage become less frequent—probably because he learns to take care of himself better and so avoid the risk of trauma. The prognosis is made worse by onset at an early age and by frequent attacks. As regards duration of life, it is exceedingly unlikely that this boy will live to be 25; thus Wickham Legg reported that out of 152 hæmophiliacs only 19 lived to be 21.

In this case a consideration of the prognosis is complicated by the presence of *extremely enlarged tonsils*. They seriously interfere with his breathing,

* 'Treatise on Hæmophilia,' 1872, p. 106.

* Of 18, Great George Street, Liverpool.

appearing to block up completely the back of the throat. The power of expansion of the thorax as a whole is very poor, and there is a high arched palate. But for the hæmophilia these tonsils would have been removed at once. In order to get him better we want to improve the quality of his blood, and the best way to do that is to give him a free air passage, but the tonsils block the way. So that here we have a vicious circle: we cannot remove the tonsils because of the peculiarity of the blood, and we cannot improve his blood because of the tonsils—at least I have found no surgeon willing to do so. Packard,* however, states that he removed the tonsils of a known hæmophiliac successfully; the case bled for 6 days, and hæmorrhage was then arrested by injecting 20 c.c. of rabbit serum into the buttock. It is of interest to note that after the present case had been in hospital some weeks he began to bleed profusely from a tooth-socket; no hæmostatic measures proved of any use, and after 6 days of it he was obviously very ill and weak, his complexion lemon-coloured and his lips pinkish-white. Ten c.c. of coagulose were then injected under the skin of the anterior abdominal wall, and the bleeding ceased in a few hours. At the site of injection an abscess formed, which, on being allowed to burst spontaneously, healed up under fomentations without any further trouble.

If the hæmorrhages become less frequent in number I shall hope to get the tonsils removed, seeing that there is a remedy apparently capable of controlling the bleeding.

* 'Diseases of the Throat, Nose, and Ear,' 2nd edit.

Death from Volvulus Caused by Round-Worms.—V. G. Heiser reports a case in a child, æt. 4 years. Two days after administration of oil of chenopodium the child developed abdominal distension with severe pains and frequent vomiting, Post-mortem a mass of round-worms the size of a man's fist was found blocking the bowel; the intestines below the mass were so twisted as to cause complete obstruction. There was local peritonitis in the neighbourhood of the obstruction. More than 300 worms were found in the intestine.—*Brit. Journ. of Child. Dis.*, p. 287.

ACTINOMYCOSIS SUPERVENING UPON GAS-POISONING IN FRANCE.

By PERCY R. COOPER, M.D., B.Sc.Lond., F.R.C.S.Eng.

SECOND LIEUT. E. J. W—, æt. 23 years, was admitted under my care at the John Leigh Memorial Hospital, Altrincham, on October 26th, 1918.

Previous history.—Prior to joining the Army he had enjoyed the best of health, and was a tall, well-built youth, weighing nearly 14 st. There was no family history of tubercle or bronchitis.

History of present illness.—On November 1st, 1917, he was badly gassed in France, and was evacuated to England with "pneumonia." He made a tardy convalescence, during which he had several attacks of "bronchitis." In April, 1918, whilst at a convalescent hospital in England, he had another sharp attack of pneumonia, both bases being affected, and was in a very critical condition, with great respiratory distress, temperature 103° F., pulse 160, rusty sputum, dulness and bronchial breathing over both bases, but more markedly on the left side. Empyema followed on the left side, and this was opened and drained, with some rib resection, on May 11th, 1918. He improved considerably after the draining of the pleura, but a month later his temperature again rose, and he complained of pain on the right side of the chest, where there was dulness and impaired vocal fremitus. As this did not clear, the right pleura was explored, but with a negative result.

A month later, an abscess having formed external to the ribs on the right side of the chest, this was opened, a quantity of pus and broken-down tissue evacuated, and a sinus exposed under the neck of the eighth rib. The whole track, having been cleaned out, was packed with Bipp gauze.

A week later a "residual abscess" appeared at the left thoracic base; this was opened, and vent given to about 5 oz. of very fœtid pus. Tube drainage was adopted.

Bacteriological examinations were made of the sputum and pus. The sputum showed no tubercle bacilli, but a number of other organisms—notably streptococci. The pus exhibited a streptothrix—

the actinomyces—thus establishing the diagnosis of actinomycosis.

An *X-ray examination* showed no evidence of bone disease, either in the ribs or spine.

The patient was given large doses of potassium iodide, placed in the open-air ward, and given as generous a diet as he could take.

He complained of considerable pain, for which hypodermic injections of morphine became necessary. He had also a most distressing cough, which was but little relieved by sedative and expectorant drugs.

Abscesses kept forming at various places on the back, and on opening left discharging sinuses, with unhealthy-looking granulations, suggestive of tuberculosis. Within the last few weeks the symptoms pointed to a subdiaphragmatic abscess on the left side. There was considerable pain, dulness, and the left lobe of the liver was pushed down well below the costal margin.

Fomentations were applied, and an endeavour made to get the abscess to point. It was not considered advisable to do a formal operation owing to the patient's extremely weak and emaciated condition, and the fact that the actinomycotic infection was evidently too generalised. As a matter of fact pointing did occur in the scar of the old empyema wound on the left side, and a quantity of extremely fœtid pus was evacuated under local anæsthesia (ethyl chloride spray). This, however, only gave very temporary relief.

During the last week the cough became almost continuous. Large quantities of blood-stained offensive sputum were brought up. The wasting became extreme, the pulse feeble, and dropsy appeared in both legs. Death resulted from heart failure, the patient being conscious almost to the last moment.

Comment.—There can be no doubt that the "gassing" in France was the original cause of the lung infection which eventually—nearly 14 months later—killed the patient.

The exact nature of the "gas" could not be ascertained, and how and when the actinomyces got a footing is also uncertain. Had it not been for the bacteriological report—which was confirmed on more than one occasion—the diagnosis would almost certainly have been tuberculosis, as the disease ran a somewhat similar general course, although of course the occurrence of empyemata in pulmonary tuberculosis is comparatively rare.

I have had several cases of empyemata following "gassing," but these, although certainly more refractory than ordinary empyemata (*i. e.* pneumococcal) have usually done well after being properly drained.

It would be interesting to know if many other cases of actinomycosis of the lung have followed "gassing" in France. If these could be carefully compared, a clue might be obtained to the mode of admission of this insidious but fatal microbe—the damage to the lung by the "gas," presumably, merely prepares the soil. No doubt other pathogenic organisms also played a part, if not perhaps the chief part, in producing the immediate fatal issue. Amongst these the streptococcus was probably the most active. An autogenous vaccine was, in fact, prepared from the patient's own streptococci, and several injections were tried, but unfortunately without any marked or lasting benefit. I cannot conclude without recording my admiration for the wonderful courage and fortitude displayed by the patient throughout his long and painful illness, caused by a most inhuman mode of warfare, which ought in the future to be made impossible.

Tick-Bite of the Conjunctiva. — Kiilerich reports the case of a young girl who complained of a foreign body which had settled on the right eye the day before. A subconjunctival effusion of blood was found on the temporal side of the eyeball. In the centre of this effusion a red, round body, of the size of a small pin's head, was perched. With considerable difficulty it was detached by forceps, and it proved to be the six-footed larval stage of the *Ixodes ricinus* (Linné). This tick attaches itself to mammals, including man, by thrusting its proboscis, with barbs directed backwards, through the skin. As it sucks its victim's blood its body grows much larger, eventually attaining the dimensions of a pea. Its size at this stage is also due to the eggs it contains. Probably the tick had first settled on the patient's right hand and had been brushed off on to her eye in the act of rubbing it.—*Ugeskrift for Laeger*, p. 1518.

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Editorial correspondence should be addressed to the Editor, 18, *Brownswood Park, London, N.* 4; *business communications to the Publishers*, 23, *Bartholomew Close, London, E.C.* 1. *Telephone, City* 956.

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DANGERS ATTENDING THE DILATATION OF STRICTURE

WITH REMARKS ON THE TREATMENT OF EXTRAVASATION OF URINE.

By R. L. SPITTEL, F.R.C.S.Eng.,
Surgeon, General Hospital, Colombo; Lecturer on Operative Surgery, Ceylon Medical College.

THE dangers of urethral instrumentation are well known to those who have much to do with the treatment of urethral stricture. The improper use of bougies may be attended with consequences varying from a slight rise of temperature to disturbances culminating in death. Even the most careful use of urethral instruments in cases of neglected stricture with infection of the urinary tract and inadequacy of kidney function is apt to be attended with grave danger. A thorough examination of the urine, and, in septic cases, an estimation of kidney function by methylene blue and phloridzin tests and the determination of the urea content are, therefore, an absolute necessity prior to dilatation. Sometimes the very means adopted—cystoscopy and ureteral catheterisation—to ascertain functional incapacity, may set up dangerous reactions. It is only by a knowledge of the condition of the urine in every case that we can be on our guard in a serious one, adopting only the gentlest of measures to begin with, progressing step by step in treatment with the greatest circumspection, and keeping a careful watch for any untoward symptoms that may call for timely interference.

The great menace to life by indiscriminate and careless dilatation of stricture cannot be over-emphasised. A man with stricture may be said to live on the brink of a precipice; more so if he does not realise the gravity of the neglect of his condition.

Such a man may get a sudden attack of retention with fatal extravasation when far away from skilled surgical aid. It may be that the attack of retention will take him to an incapable or careless medical man; his danger is then not less; it is, perhaps, greater than if nothing were done, for the formation of a false passage or the introduction of hitherto absent infection may only serve to precipitate a fatal phlegmonous cellulitis ("extravasation of urine") behind or in front of the triangular ligament (Cases 4, 6, and 7), or set up a pyelo-nephritis ("surgical kidney") that will slowly and surely end in death unless dealt with adequately (Case 2).

Cases of this sort are commoner than even experienced surgeons would like to admit. The tendency is to regard them as dark chapters of practice, the sooner forgotten the better. This attitude is defenceless and is but a menace to future patients. Our best lessons are learnt from surgical disasters, and these are multiplied tenfold if the clamant lesson they teach goes unheeded. The full responsibility of blame must be realised and the fearful lesson taken to heart, lest we lapse to the old indifference and repeat the same mistake, with humiliation to ourselves, and, what is much worse, the sacrifice of other lives.

In private practice calamities after urethral instrumentation occur seldom, perhaps once or twice in a surgeon's lifetime. But this paper is a plea, not for the well-to-do who can command the best skill, time, and care of the profession, but for the poor who seek relief in our hospitals—especially tropical hospitals, where conditions prevail which have not their precise prototype in the more civilised European centres. The picture is this: The ignorant native seeks treatment only when the stricture is far advanced. By the time he gets to hospital one of several conditions may be present: (1) The *stricture is always exceedingly tight* and all but impermeable; sometimes the entire penile urethra is a solid block of fibrous tissue that resists the passage of the smallest instrument. (2) In addition to this the perineum, penis, scrotum, and even buttocks may be riddled with *infected* sinuses banked by fibrous tissue so dense that the fistula-ridden area is puckered and distorted, and what remains of the urethra twisted and kinked. When the patient micturates, the resemblance is more to a watering-can than anything else, and the pain is severe. (3) Frequently nothing short of *extravasation of urine* that has occurred spontaneously or been precipitated by crude efforts at dilatation, brings the patient to hospital. Such is the material with which a surgeon in a large tropical hospital has to deal and such is the type of case here cited; they have been picked from the practice of more than one surgeon out of a series of several hundred cases.

CASE 1. *Death from septicæmia 15 hours after dilatation of stricture.*—A man, æt. 50 years, was admitted with a tight penile stricture. He had a discharge from the urethra, as well as scrotal fistulæ surrounded by dense fibrous tissue. The stricture was forcibly dilated at 9 a.m.; there was some hæmorrhage. The urethra was not irrigated either before or after dilatation; the bougie was left in for a couple of hours. No evidence of any constitutional disturbance appeared until the patient made an attempt to urinate; 5 or 10 minutes after this he felt chilly, developed a rigor, and his temperature rose to 103° F. The temperature remained high until midnight, when he suddenly collapsed and died—15 hours after dilatation. The necropsy revealed no gross changes. Death was probably due to septicæmia.

This case illustrates in a dramatic way the terrible danger of dilatation of stricture in the presence of urethral infection. The explanation of such a catastrophe is that the forcible passage of a sound rubs the infection resident in the urethra into torn tissues inoculating the patient with a large dose of highly virulent organisms. The case also illustrates a point often observed after dilatation, viz. that the signs of constitutional disturbance set in almost immediately after the patient's first attempt at micturition subsequent to dilatation.

CASE 2. *Death from "surgical kidney" 24 days after dilatation of stricture.*—D. P—, æt. 55 years, male, Cingalese, came with a stricture and blood-stained urethral discharge containing staphylococci and streptococci. For the last 10 months he had been able to pass urine only in drops and that incessantly day and night.

On May 12th, 1915, *dilatation* was performed; there was some bleeding. The next morning the patient's temperature was 100° F.; he complained of great pain in the hypogastrium; the difficulty in micturition was not relieved (indicating probably a false passage and non-dilatation of the stricture). On the following days the hypogastric tenderness gradually increased; a creamy urethral discharge was present; micturition remained difficult and scanty. The urine was acid; it contained slight traces of albumen and pus cells in abundance, together with streptococci and colon bacilli. Later, vomiting supervened, and he complained of a feeling of faintness and ringing noises in the ears. The left loin was tender to fist ercussion.

As for treatment, urinary antiseptics were given by mouth and the bladder was washed out daily with boric and silver nitrate solutions. On May 26th a toxic rash, not unlike that of measles, appeared all over the body. He then gradually became apathetic, and refused food. Urine and fæces were passed in the bed-clothes. By June 5th he had become quite delirious, screaming out at frequent intervals. On the 6th he was seized with a tremor and died that night. The necropsy showed an abscess in the lower pole of the left kidney and pus in the pelvis and calyces of the right.

Death in this case was due to *ascending pyelo-nephritis* and occurred 24 days after dilatation of the stricture. It is possible that a timely nephrotomy with drainage of the kidney might have saved the patient.

CASE 3. *Peri-nephritic abscess following catheterisation of healthy urethra.*—M—, æt. 47 years, Cingalese, male, was admitted with pain in the right loin radiating towards the hypogastrium. The *history* was that 5 months previously he had been operated on for hæmorrhoids, and had then to be catheterised on 3 occasions owing to reflex retention of urine. Two months after this he experienced a burning sensation in the urethra with frequency of micturition and the passage of only small quantities of urine at a time. Four days later he had pain in the left loin, where, in the next few days, a swelling developed, rendering it impossible for him to sleep on that side. Two weeks after the onset of the lumbar pain, an abscess was opened through a lower intercostal space, in which position a sinus still persisted.

The *present condition* of pain in the right loin began with a chill and fever 6 days ago. No swelling was present. Difficulty and frequency of micturition were, as on the previous occasion, the initial symptoms and preceded the loin pain by 2 or 3 days. The urine was acid and contained pus cells and colon bacilli in abundance; there were also a few red blood-cells. Treatment by means of rest, purgation, urinary antiseptics, fomentations, and cupping staved off suppuration.

This case shows the absolute necessity for the strictest asepsis in catheterisation—an axiom well known to the veriest tyro of surgery, but the observance of which in the matter of detail, is only too often slurred. So distressing and persistent can coli infection of the urinary passages be, that a patient may be rendered a chronic invalid by it; and, what is more to be regretted, he may have earned the infection merely as a side-issue to some such operation as a herniotomy or removal of hæmorrhoids in which reflex spasm just after operation necessitated catheterisation. What often happens is that the house-surgeon culpably leaves the catheterisation to a ward attendant and the mischief is done.

CASE 4. *Dilatation of stricture; false passage; rupture of urethra behind the urogenital diaphragm; death.*—A. S—, æt. 28 years, male, Cingalese, came complaining of frequency of micturition—"about sixty times a day"—and a burning sensation in the urethra during the act. He had both syphilis and gonorrhœa about 5 years previously; and had a stricture dilated in hospital on 3 previous occasions.

On January 20th, 1917, his stricture was dilated to $\frac{1}{18}$ths without previous irrigation. That evening his temperature was 100° F., and he complained of *pain and tenderness in the hypogastrium*. By the 22nd the hypogastric tenderness had increased; there was no swelling or pain in the perineum; urine was passed with great difficulty and only in drops; his nights were sleepless. Paravesical extravasation behind the urogenital diaphragm (triangular ligament) was suspected. A supra-pubic incision was made, and a drainage tube retained in the fossa of Retzius; a silver catheter was tied into the urethra; this was removed on the 24th. On the 25th his morning temperature was 100·4° F.; the *abdomen was distended* and the bowels loose; offensive urine was being passed freely. The abdominal wall, just above Poupart's ligament, was the seat of a *boggy reddish swelling*. The loins were somewhat tender, especially the right. The patient's aspect was apathetic, and he would take little or no food. On the 31st the bladder was thoroughly irrigated, and a large quantity of very foul pus and urine was evacuated; a rubber catheter was tied in. After this, the bladder was regularly washed out with hydrogen peroxide and silver nitrate solutions. The patient, however, rapidly lost ground, the urine remaining blood-stained and extremely fœtid, and died at 9 p.m. on February 2nd, two weeks after dilatation of his stricture.

Post-mortem revealed the bladder black, gangrenous, and adherent. Both kidneys were congested and enlarged, pus was present in the right.

Here is a good example of the signs and symptoms that occur when extravasation of urine takes place behind the urogenital diaphragm—a complication that sometimes occurs after dilatation of strictures The symptoms are apt to be overlooked unless the nature of the condition is recognised. What happens is that the stricture is split beyond the limits of the urethra down to the cellular planes of the pelvic fascia behind the urogenital diaphragm (superficial and deep layers of the triangular ligament), or the infection travels from a less considerable tear, seeking out fascial planes by continuity of tissue or by the lymphatics. Such extravasation is not followed, as in the classical extravasation in front of the urogenital

diaphragm, by swelling in the perineum, scrotum, and penis—a route determined by the attachments of Colles' fascia. *Pain and tenderness in the hypogastrium is the first danger signal of extravasation behind the urogenital diaphragm*, and later, the appearance of infiltration and swelling in the lower abdominal wall just above the inguinal ligament (Poupart's).

The treatment adopted in this case was hesitant and inadequate. It consisted of supra-pubic incisions, catheterisation, and irrigation of the bladder—measures which did not provide for adequate drainage of the infected pelvic cellular tissues.

CASES 5 and 6. *Stricture with cystisis; dilatation; extravasation of urine behind the urogenital diaphragm; death.*—In both these cases death after dilatation was due to gangrenous cellulitis of the bladder. In each case the phenomena were alike. The genito-urinary passages were previously heavily infected; in one tubercle with secondary infection was present. The infection started from the torn sites of the strictures and spread as a phlegmonous cellulitis along para-vesical cellular planes, tracking down towards the ischio-rectal fossæ, where foul, gangrenous abscesses were opened. Both cases terminated fatally. When symptoms of anorexia, apathy, and hypogastric tenderness were well advanced, perineal cystotomy was performed in each case, 5 to 7 days after dilatation, too late to save life.

A *necropsy* was carried out in one case, and revealed a gangrenous bladder, which came away in pieces. Pus was found tracking up along both ureters, which were also gangrenous. Gangrenous cellulitis was present in the lower anterior abdominal wall. Both kidneys were enlarged, and the seat of miliary tubercles and caseating foci. Tuberculous cavities were present in the lungs.

These cases (like *Case* 4) are typical of extravasation behind the urogenital diaphragm progressing to a fatal termination, and the two should be compared. Here, in addition, gangrenous ischio-rectal abscesses were present.

The danger of dilating a stricture when the genito-urinary passages are the seat of secondarily infected tuberculosis is obvious.

To set against these depressing cases of mortality we will now take a case, very similar to the preceding, in which timely intervention saved the patient's life.

CASE 7. *Stricture; dilatation; signs of extravasation; perineal cystotomy; recovery.*—P. A—, a well-nourished Cingalese, male, æt. 40 years, was admitted with stricture of 10 years' duration, the result of gonorrhœa. He suffered from time to time with attacks of frequency of micturition and retention of urine. Pus cells, streptococci, and staphylococci were present in the urine.

On November 15th, 1917, a tight bulbous *stricture was dilated* to $\frac{8}{11}$ths. There was much bleeding. The urethra was irrigated both before and after dilatation. That evening his temperatore was 99·6° F. His urine did not pass freely.

November 16th, 1917.—Morning temperature, 103·2° F.; pulse, 136. He had a chill and rigor the previous night, after which the fever rose. He complained of a sense of oppression in the chest, and of pain in the hypogastrium radiating to the root of the penis, also of pain in the loins, which travelled down towards the sacrum. He had thirst and headache. There was a burning sensation in the urethra during micturition; the urine was clear. Evening temperature, 102·4° F. He refused food and looked very ill.

November 17th, 1917.—Morning temperature, 101·4° F. As his condition was not improving, *perineal cystotomy* was performed, and a tube retained in the bladder, which was washed out with silver nitrate solution; foul urine was removed. Evening temperature, 100° F.

Subsequent to this, the bladder was irrigated daily, and the symptoms rapidly cleared. His apathy passed off, his appetite quickly returned. By the 20th he was out of danger. He was, however, reduced in the few days of his illness from a strong man to an exhausted weakling—so profound is the systemic disturbance in these cases.

This case is only one of many, illustrating the *great value of perineal cystotomy* when the first signs that all is not right at the site of dilatation show themselves. By this simple operation I have repeatedly saved the lives of patients who would otherwise certainly have died.

What are we to learn from these cases, whose claims to consideration are based not on their rarity but on the frequency and suddenness of their occurrence and the awful jeopardy to life with which they are attended?

We may summarise the lessons as follows, beginning with a time-worn maxim of urethral surgery:

(1) *The greatest gentleness should always be exercised in the dilatation of strictures*—a hundred times so when the urinary passages are the seat of infection as revealed by urethral discharge, pus, and organisms in the urine, etc.

Dilatation should be gradual. Rapid dilatation, involving as it does much tearing of tissues and inoculation of the patient with infection present in the urethra, cannot be too strongly condemned.

The presence of the sound in the bladder in difficult cases should always be *verified by the introduction of a gloved finger into the rectum*; if the

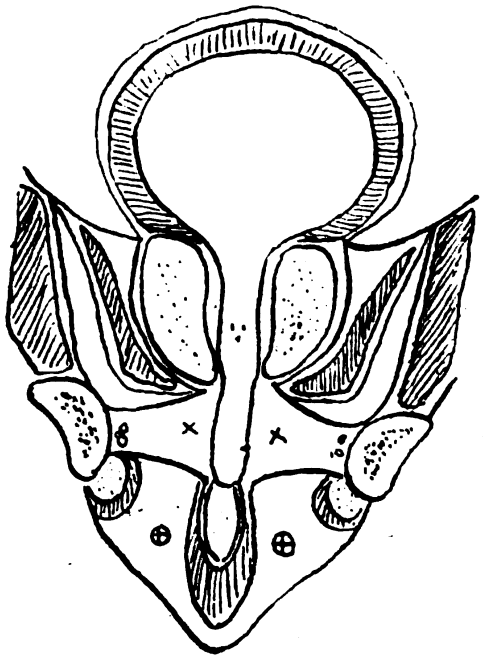

FIG. 1.—Vertical section through the pubic arch to show the two perineal compartments in which extravasation occurs. The mark X lies between the two layers of the urogenital diaphragm; the mark O with a cross inside it, between the fascia of Colles and the inferior fascia of the urogenital diaphragm. (After Cunningham.)

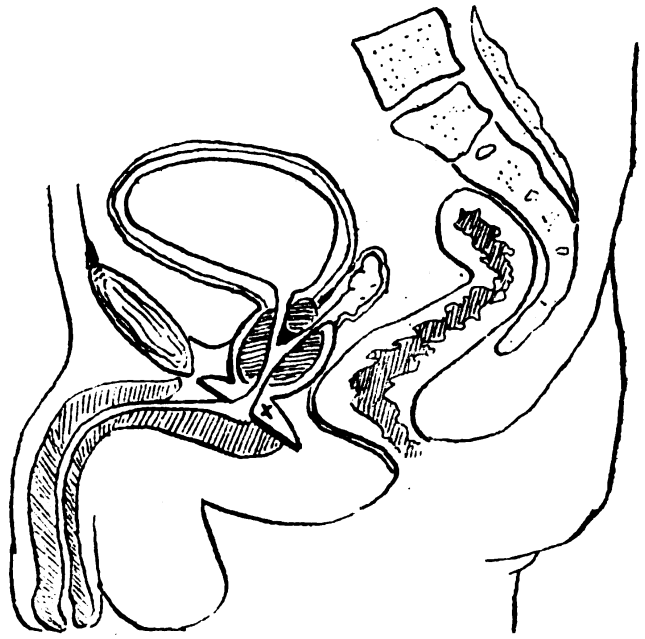

FIG. 2.—Sagittal section of pelvis showing distribution of pelvic fascia. The mark X lies between the two layers of the urogenital diaphragm (triangular ligt.). The direction of spread of extravasation from this point round the prostate and bladder may be seen. (After Cunningham.)

sound has been carelessly passed, surprising revelations may thus result, such as the point of the instrument in the rectum. I know of no better expedient in the dilatation of tight strictures than the guiding of the sound by the index finger placed in the rectum and the thumb of the same hand on the perineum; false passages are thus averted.

The urethra should be thoroughly irrigated both before and after dilatation. In this way severe febrile reactions ("catheter fever") are avoided, as also other complications such as epididymitis, metastatic joint infections, spreading cellulitis ("extravasation of urine"), and ascending pyelonephritis ("surgical kidney"). The best irrigating solutions are boric, potassium permanganate and silver nitrate (gr. 1 to 2 to a pint).

After dilatation of infected urethræ the patient's condition should be very carefully watched, his temperature taken, etc

(2) If, in spite of these precautions, dilatation be followed by symptoms of pain in the perineum or hypogastrium, the frequent passage of only small quantities of blood-stained urine, and severe constitutional disturbance—such as a feeble, quick pulse, cold extremities, and later loss of appetite, apathy, and inanition—then *extravasation is imminent and no time should be lost in performing perineal urethrotomy* with the retention of a tube in the bladder which should subsequently be irrigated twice daily. Intervention must be prompt if the patient is to be saved—certainly within 3 or 4 days, preferably within 48 hours. With experience it is easy to say as early as this whether the patient's life is menaced.

(3) A word with regard to *extravasation of urine*. Some hold this to be due not to an extravasation *per se*, but to a rapidly-spreading cellulitis which spreads to the peri-urethral tissues either by phlebitis and thrombosis in the corpus spongiosum or along the ducts of the glands of Littré, Cowper's gland, and the prostate. Be this as it may, a diffuse phlegmonous process manifests itself as a brawny induration in one of two ways:

(A) *In front of the urogenital diaphragm* (triangular ligament) where it follows the classic course

over the perineum, scrotum, and penis, determined by the attachments of Colles' fascia.

(B) *Behind the urogenital diaphragm* in the superior perineal compartment. In this event the clinical manifestations are much less apparent than in the former. The lesion being deeply seated, visible signs do not develop until the process is well advanced and the condition of the patient grave. Here the cellular tissue of the pelvis is invaded and the *first signs* are *tenderness in the hypogastrium* and a *red œdematous swelling round the rectum and in the ischio-rectal fossa.* Later, a brawny œdema occurs in the lower abdominal wall as well, and a diffuse gangrenous cellulitis occupies the pelvis involving the bladder and tracking up the ureters; but when this stage is reached the patient is beyond help.

It may be asked what has extravasation of urine to do with dilatation of stricture? The answer is supplied by the cases quoted, which show that both types of extravasation may and do occur when clumsy and forcible attempts at dilatation are made. After such a careless instrumentation the symptoms are much as follows (they bear repetition): A free flow of blood through the urethra just after dilatation, scanty urination, pain and tenderness in the perineum and sacral region if the extravasation is in front of the urogenital diaphragm, in the hypogastrium and anal region, if behind it. Added to these, the patient is collapsed, refuses food, and rapidly loses ground.

These are the danger signals. What is to be done? In slight and early cases of extravasation the retention of a catheter in the bladder may be all that is necessary, but this is anything but adequate in advanced cases, for the pre-prostatic collection of pus and urine is not drained by this measure. *A deep and ample perineal incision with the retention of a drainage tube in the bladder through the perineal wound is the main point in the treatment of both types of extravasation.* Multiple incisions in the infiltrated areas with antiseptic compresses are necessary adjuncts. Drainage of the fossa of Retzius by a suprapubic incision is called for if hypogastric tenderness and induration point to paravesical extravasation; and nephrotomy and drainage if the patient is sinking from pyelo-nephritis.

DIATHERMY.

By E. P. CUMBERBATCH, B.M.Oxon., M.A., M.R.C.P.,

Medical Officer in Charge of the Electrical Department, St. Bartholomew's Hospital, etc.

(*Concluded from p.* 20.)

Medical Diathermy.

By means of diathermy the temperature of the whole body or of any part of it may be raised and the therapeutic properties of heat utilised where desired. In answer to the question, "Which maladies or morbid conditions can be effectively treated by diathermy?" the answer is, "All those which can be benefited by heat." But hitherto all methods of applying heat for *medical* (apart from *surgical*) purposes have raised the temperature only of the skin overlying the diseased part. Consequently a lengthy clinical investigation has had to be undertaken to determine the special therapeutic properties of diathermy in different diseases. I commenced the trial of diathermy for various maladies in the Electrical Department of St. Bartholomew's in 1912. The cases treated were out-patients, suffering usually from chronic complaints for which the treatment by medicine has been ineffective.

The diseases and morbid conditions which have been found to yield most readily are:

(1) Peripheral neuritis (sensory nerves); (2) symptoms which result from or accompany unduly high arterial blood-pressure; (3) cases which, while presenting no signs of organic disease, have a subnormal temperature and complain of feeling always cold, and at the same time suffer from minor troubles, such as dyspepsia, constipation, headache, etc.

In addition, excellent results have been obtained by treating some other maladies by diathermy. These will be mentioned hereafter, but no final or inclusive statement can yet be made regarding them, either because a sufficient number has not been treated, or because the failures have outnumbered the successes.

(1) *The treatment of pain due to peripheral neuritis.*—I have treated a large number of cases of painful shoulder and sciatica by diathermy. The method formerly used was the application of

large electrodes so as to cover the whole area in which pain is felt. Another method was afterwards adopted and gave considerably better results. The tender points are first located and an active electrode, disc-shaped, 1 in. or 1½ in. in diameter, covered with felt soaked in strong salt solution, is applied for 5 minutes to each tender area in succession. The current is made as strong as can be tolerated without pain. The indifferent electrode is larger, say 6 in. by 3 in., and is placed on some distant part of the limb. Pain is greatly relieved by this procedure or even abolished, but recurs after a few hours. Patients who are treated in the morning frequently say that they remain comfortable till 6 or 7 in the evening, when the pain returns. If treated in the afternoon they say that they go to bed without pain, but are awakened by a return of the pain some time during the night. Usually the pain returns with less severity after further applications have been made, and after a week or fortnight it disappears or becomes trifling. In cases which are very painful the treatment should be given daily or even twice daily. If given daily it should be applied late in the day so as to ensure, as far as possible, a night's rest. I have obtained the best results in neuritis of the neck and upper limb. In cases of sciatica the results were less good. Pain was relieved for a few hours, but returned, and it was not possible in many of them to reduce its severity much. Possibly the reason was the long duration of the disease; most of the cases had lasted, with intermission or remission, for one or two years or longer. Better results were obtained with more recent cases.

Almost all the cases of peripheral neuritis treated were out-patients or private patients not confined to bed, and all had received a trial of other methods of treatment, so the test of the efficacy of diathermy was severe. The results were therefore encouraging.

(2) *The treatment of symptoms due to, or accompanying high blood-pressure.*—Patients with abnormally high blood-pressure have, during recent years, been treated with high-frequency currents with the endeavour to lower the pressure. Before the days of diathermy, so-called, the high-frequency currents used in medicine were *unsustained* and the degree of heat developed was trifling or unappreciable. With *sustained* high-frequency currents a high degree of heat can readily be obtained, and the effects of the diathermy have been tried on cases presenting an unduly high arterial pressure. The pressure can be reduced by applying diathermy in one of two ways. The active electrode can be placed on the præcordium and the temperature of the cardiac muscle raised, or two active electrodes can be placed one on each palm or forearm. In the latter method the upper limbs are heated, together with the blood circulating through them. Heat is thus distributed by the blood throughout the body, and the temperature of the latter can be raised 1, 2, 3 or more degrees. If the elevation of the blood-pressure is *compensatory*, to secure an adequate flow of blood through constricted arteries, or arteries with diminished expansibility, no benefit will be obtained by lowering the pressure. The writer has obtained in two cases relief of cardiac pain, palpitation and dyspnœa by applying diathermy to the præcordium, for short periods not longer than 5 minutes at each session, without lowering the systolic blood-pressure. In other cases relief was obtained with a lowering of the pressure. Cardiac pain is often relieved by diathermy applied to the præcordium. True angina is, according to Nagelschmidt, at once relieved in this way; I have not had the opportunity of applying the treatment during an attack.

Some patients do not derive apparent benefit from diathermy applied to the præcordium; these cases should then receive a trial of general diathermy, the treatment being applied daily or every other day for periods of increasing duration from 10 to 30 minutes. Some feel much better for this treatment and lose their distressing symptoms; others, however, feel comfortable during the treatment, but the symptoms recur before the next application.

There is another class of case for which treatment by diathermy renders much benefit. These cases have a subnormal temperature, and feel cold and miserable in the autumn and winter months. The hands and feet are frequently cyanosed to a slight degree, and always chilly. They often suffer from dyspepsia and constipation. The name "misère physiologique" has been applied by Bergonié to this type of case, in which the physiological processes are sluggish. Many patients attending the Electrical Department for treatment of various maladies are frequently cases of "misère physio-

logique," and if they are receiving treatment by diathermy and are asked how they are the answer is given that they are feeling much better in their general health, even if the local malady for which the diathermy was primarily given has not subsided. If the diathermy is applied so as to raise the temperature of the whole body the benefit derived is greater.

Diseases due to infection by the gonococcus appear to be very amenable to diathermy. Good results have been reported on the treatment of gonococcal orchitis and epididymitis. It is said that the elevation of the temperature of tissues infected by the gonococcus to a degree that does not harm the body readily destroys the organism. The temperature of the scrotum and its contents can be raised throughout by diathermy. In a paper by Navarro Canovas ('Revista de Sanidad Militar,' March 15th, 1917) the results of the treatment by diathermy of 73 cases of gonococcal orchitis and epididymitis were published. Pain was alleviated after the first application, and afterwards disappeared rapidly, so that the patients were able quickly to resume their work, wearing a suspensory bandage.

I have treated 3 cases of gonorrhœal arthritis by diathermy. The joints were painful and slightly swollen. The symptoms were quickly removed. Another case with many joints affected, with limitation of movement and thickening of the extra-articular fibrous tissue, was not improved. Diathermy is not likely to do much good if there is extensive thickening of the capsule and ligaments, or damage of the joint surfaces.

Diathermy has been applied to many other types of disease besides those already considered so as to test its healing powers. These may now be briefly mentioned. In some a few cases only have been treated, so that no general conclusion is permissible.

A large number of cases of rheumatoid arthritis and osteo-arthritis have been treated by diathermy in the Electrical Department of St. Bartholomew's —with indifferent results. Pain was relieved for a short time in some of these cases, but usually for not more than 2 or 3 hours—occasionally for the rest of the day. The patients were desirous, however, of continuing the treatment indefinitely if allowed. A few cases in which it was prolonged for a long period, in the hope of permanently abolishing the pain, developed, sooner or later, acute pain in the same or other joints, and the diathermy appeared then to be ineffective in procuring relief.

Three cases of paralysis agitans have been treated. The tremors were markedly diminished, the gait was improved, and the patients felt much better in their general health. The results were, however, not permanent, and a relapse into the original condition was noted 6 months after the cessation of the treatment.

Two cases of obstinate metatarsalgia were treated. In one of these, surgical treatment had been of no avail, and all other forms of electrical treatment had been equally unsuccessful. The pain gradually disappeared, and the patient was able, at the end of the course of treatment, to walk for long distances without pain. The result was equally good in the other case.

Cases of chilblain circulation of the extremities, with or without œdema, have been treated in the hope that the artificial raising of the temperature of the cold limb to the normal would restore the circulation and produce a cure. After an application of diathermy the colour of the skin is seen to have changed to a rosy red. The change is not permanent, and the dusky blue colour soon returns.

Diathermy has been applied for treatment of chronic affections of the female pelvic organs. In a paper in the 'Revista Española de Electrogia y Radiologia médicas' for April, 1917, by Poblacion, a series of 97 cases is described. Electrodes were placed on the abdomen and lumbo-sacral region, and the temperature of the pelvic structures were raised to 107° F. Relief of pain was produced by this treatment. I have treated one case only of chronic inflammation of the pelvic cellular tissues, and the pain and discomfort was abolished after the second application.

I have recently tried the effect of diathermy on two cases of very painful dysmenorrhœa of the painful contraction type. The pain was very intense on the first day of the flow, and confined both patients to bed. Diathermy was applied to the pelvis for 6 days consecutively (Sundays omitted) before the expected onset of the pain In both of these cases the period after the treatment was nearly painless.

INCOMPLETE ABORTION.

By JOHN BENJAMIN HELLIER, M.D. Lond.,
Consulting Obstetric Physician to the Leeds Infirmary.

THIS is a short study of a very common condition. Some years ago I found that the proportion of cases of abortion or miscarriage amongst gynæcological patients in this district is about 1 to every $5\frac{1}{2}$ full-term deliveries. I use the terms "abortion" and "miscarriage" indiscriminately in this paper. I estimate that of cases admitted to my wards during the last 19 years about 6 per cent. have been women suffering from incomplete abortion. The chief symptom of which they complain is almost always menorrhagia or metrorrhagia, or both. It is also one of the most remediable of gynæcological conditions. The occurrence of early abortion is very often overlooked, and the patients are often very incredulous when they are told what has occurred. The proof positive is furnished by finding chorionic villi in the tissues removed. The microscopic appearance of villi is easily recognised by any medical student.

Two different types of case may be distinguished. The first class includes cases occurring in the latter part of the third month and the fourth month of pregnancy, where there is a well-defined placenta or a large part of one retained *in utero*. The hæmorrhage is often very severe, and the patients come in much blanched. The cases are recent, and they have had usually no proper medical attendance, or have only just been seen by the medical man who sends them in. The bleeding will never cease till the uterus is completely evacuated. Unaided Nature is a very inefficient obstetrician in such cases.

A second type of case is characterised by the retention of but a small fragment of chorionic tissue, and by the long time that often has elapsed between the onset of the abortion and admission to hospital. Such patients will often say that menstruation was regular till a few months ago, that they then went a week or two beyond their time, and that they have had ever since irregular and excessive loss. Such a history may extend over six months or more. Very possibly there may have been no amenorrhœa at all; but the sudden onset of menorrhagia in a patient previously regular should always raise a suspicion of the possibility of abortion, and should lead to intra-uterine exploration. The fragment of tissue *in utero* may not exceed the size of a kidney bean, but its removal will cure the symptoms.

It is worthy of note that such patients rarely come up with symptoms of sepsis. A small portion of chorion will remain aseptic *in utero* for a very long time. A large portion of placenta may indeed become septic, but if a patient comes with septic symptoms after a very early abortion one has always a suspicion that there may have been some artificial interference with the pregnancy.

The only treatment for such cases is complete evacuation of the uterus. The patient is anæsthetised and placed in the perinæal position. (I think it is time that we gave up calling this the "lithotomy" position. No student to-day has seen lithotomy performed in the so-called lithotomy position, and very many cannot tell why it is thus designated.) The uterine sound is first passed to estimate the size of the uterus. If the sound goes 4 in. or more into the uterus, and the whole organ is bulky and the cervix easily dilatable, it is not wise to attempt to evacuate the uterus with the curette alone. The cervix must be dilated till the gloved finger can be passed beyond the orificium internum. With the other hand manipulating the fundus the whole endometrium is explored by the finger and the retained placental portion is thoroughly loosened, the finger not being withdrawn till this is satisfactorily accomplished. There is a gush of clot and free blood as the finger is withdrawn. A pair of small-bladed smooth ring forceps, such as a sponge-holding forceps, is then used to withdraw the placenta. The cavity is next flushed out with a flushing curette and antiseptic solution. Nothing is better for this purpose than tr. iodi, ʒj or ʒij to Oj. The uterus may then be wiped out with gauze to remove any fragment of membrane, and it is then packed with antiseptic gauze for 24 hours to arrest any further bleeding. It is not well to leave a packing in the uterus longer than this, for nothing becomes offensive more readily than a vagino-uterine pack. We are cautioned against curetting the uterus after abortion, and against groping blindly in the uterus with a powerful ovum forceps. I have always in

my mind *in terrorem* the case of the obstetrician who passed ovum forceps into the uterus and drew out a loop of maternal intestine. But when one has loosened the placenta thoroughly, the use of the smooth ring forceps is safe and advantageous.

If you have stumbled on an aborting uterus with the fœtus not yet extruded, say in the fourth month, you need a small pair of ovum forceps to extract the fœtus piecemeal. The head will be the last thing to come, and it may need a little patience to seize it with the forceps, to compress the head and extract. If you have had to insert your finger, it is quite on the cards that you may find that you have split the cervix. In this case you draw down the anterior and posterior labia with volsellæ and pass absorbable catgut sutures to arrest hæmorrhage and repair the laceration.

If the pregnancy is a very early one you are all the more likely to split the cervix, but, as I have said, in the early cases it is not necessary to insert the finger. The curette will extract the chorionic tissue, and the whole endometrium will be found to grate under the curette in the normal way; but if you find that there is a place in the uterus where the curette passes over soft tissue, and will not yield the grating sensation which comes from the bare uterine wall, then you must dilate further and explore digitally. It is obviously a matter of judgment and experience to adapt the treatment to the condition present. I have more than once removed a considerable piece of placenta when a previous operator has curetted and wrongly concluded that he had completed the evacuation.

I may take this opportunity of saying that in the treatment of ordinary inevitable abortion patients are often allowed to lose far too much blood, thus leading to anæmia and long periods of convalescence. The earlier stages of abortion are very properly treated expectantly. As the cervix dilates it is very good practice to pack the cervix and vagina with gauze; but when the cervix is well dilated and there is free hæmorrhage, it is best to anæsthetise without further waiting and to evacuate the uterus in the manner described above.

Hæmatoma of Vulva and Vagina Obstructing Labour.—E. Petersen and A. Tofte find that hæmatoma is comparatively common post-partum: in only 24 out of a series of 96 cases did it develop before delivery. Only in a minority of these cases did the hæmatoma seriously obstruct labour.

A married primipara, æt. 25 years, had been operated on for appendicitis in the 4th month without interruption of the pregnancy. At term slight pains continued throughout the night, and in the morning at 10.30 the bulging membranes were ruptured. A little later the head had descended so as to be visible through a 1 cm.-wide space between the labia. At this stage a slight swelling of the right labium majus was observed. Œdema was first suspected, but as the swelling rapidly increased, hæmatoma was diagnosed, and the surgeon who had operated on the patient for appendicitis was sent for. He could not come, and during the time thus wasted the hæmatoma grew still larger and exceedingly painful and the labour pains became weaker. Morphine was injected, but it stopped the uterine contractions as well as the pain.

One of the writers, summoned in consultation, found the patient in fairly good condition, and though she was pale, the pulse of 84 was strong and regular. The temperature was 99·1° F. The fœtal heart-sounds were satisfactory, and the head was hidden by an enormous hæmatoma. The patient was now secured in Twedegaard's position on a frame screwed to the dining-room table, and anæsthetised with chloroform. Further examination of the hæmatoma showed it to be larger than two fists and confined to the right labium majus, extending in front to the mons veneris and behind almost to the anus. It was elastic and tense. Its outer third, covered by skin, was white; its inner two-thirds, covered by mucous membrane, were glistening purple. A little blood-stained serum trickled from a small rent in the mucous membrane. A 6–7 cm. incision was made over the swelling downwards and outwards at the junction of its lower with its middle third. Much blood, both clotted and fluid, escaped. There was now sufficient room for the forceps, and with two pulls a living boy was delivered, squeezing out several large and small clots from the hæmatoma. When its cavity was explored, two freely bleeding veins were found and secured. The hæmorrhage was completely

arrested thereby, and the cavity was obliterated by deep catgut sutures. The tissues about the incision were so friable and lacerated that they had to be cut away. The opening in the labium majus was now carefully closed with sutures. The placenta soon came away. The wound healed by first intention, and the puerperium was uneventful. No cause for the hæmatoma could be found; there were no varicose veins on the genitals or legs, and the patient had not been subject to hæmorrhages from other parts.

A primipara was admitted to hospital with eclampsia. Two attacks occurred before admission, and a third soon after. The fœtal head had descended into the pelvis, the os being fully dilated. The left labium majus was distended by a hæmatoma of the size of a duck's egg. She was at once taken to the operating theatre and anæsthetised with chloroform. Episiotomy (incision of the vulva) was performed on the right side, and axis-traction forceps were applied, a prolapsed cord being found beside the head. With two gentle pulls a living infant was born, and the placenta at once followed. The episiotomy wound was sutured. By this time the hæmatoma had become much larger, and the overlying skin, hitherto normal, was discoloured. Accordingly a 4 cm. incision was made over the upper part of the labium, a little internal to the genito-femoral furrow. Much clotted and some fluid blood was removed. Exploration through the opening made by the incision revealed a cavity of considerable dimensions, in which brisk hæmorrhage was proceeding. But no bleeding point could be found; so the cavity had simply to be plugged with iodoform gauze. This arrested the hæmorrhage. Exploration of the vagina revealed a strip of the gauze projecting through a rent in its wall. The swelling of the labium was now somewhat reduced, and the incision was partially closed by two sutures, one above and one below the gauze tampon, which was thus secured. To assure adequate drainage for the lochia, a thick tube swathed in iodoform gauze was passed into the vagina. All these steps were difficult owing to the restlessness of the patient. No further attacks of eclampsia occurred, but a little blood continued to trickle from the vagina, and the hæmatoma was no smaller. On the second day the tampon was removed, and as much blood oozed out both from the incision wound and the rent in the vagina, the plugging had to be repeated. During the next few days there was only a little oozing of blood, and on the sixth day the tampon could be removed without restarting the haæmorrhage. The wounds healed by granulation, and the temperature, which had been as high as 101·8° F., was normal by the twelfth day. The hæmoglobin, which was 60 per cent. on the second day, was 70 per cent. on discharge. The albumen disappeared from the urine, and when she was examined a fortnight after discharge there was no abnormal swelling of the left labium majus. Apart from the albuminuria, which some authorities have associated with the causation of hæmatoma vulvæ, there was nothing to account for the origin of the hæmorrhage in this case. There were no varicose veins, and no record of other severe hæmorrhages.

In the next two cases, details of which they give, the writers again failed to find the cause of the hæmatoma. An interesting feature of one was the development of the hæmatoma after the birth of one twin. The hæmatoma, of the size of a goose's egg, on the right labium majus, arrested the birth of the second twin, and while the accoucheur was pondering over the comparative merits of episiotomy to one side or other, the hæmatoma ruptured through the vagina. As the obstruction was thus removed, and as rapid delivery was urgently indicated on account of the continuous hæmorrhage, a leg was pulled down (it was a breech presentation) and labour speedily terminated. The infant was stillborn. The placenta was at once removed by light pressure. On the right side of the vagina a 6–7 cm. long tear was now found, communicating with a large cavity partly occupied by blood-clots. At the highest point in this cavity and above the upper limit of the opening in the vaginal wall a bleeding vessel was found and secured. The bleeding ceased at once. The opening in the vagina was closed by catgut sutures passed to a considerable depth so as to obliterate the cavity. Recovery was uneventful.

None of the theories advanced to account for such cases is tenable. Albuminuria, for example, is usually unaccompanied by hæmatoma vulvæ, and this, when present, is usually unaccompanied by albuminuria. Again, varicose veins of the vulva are so seldom found in cases of hæmatoma vulvæ that they can scarcely be regarded as a cause. Whatever the cause, the hæmorrhage can

take place at widely separate points; a blood-vessel may give way in the vulva or at a much higher level, even above the pelvic fascia.

The mode of rupture of a blood-vessel is probably the same for ante-partum as for post-partum hæmatoma. The latter is the more common because it includes cases in which blood-vessels were ruptured ante-partum, but the presenting fœtal parts compressed the injured vessels and prevented any considerable escape of blood. When the hæmatoma develops ante-partum the fœtus has evidently not pressed uniformly on the bleeding spot. The hæmorrhage is probably often intermittent, blood escaping into the tissues between the pains, which, when strong enough, force the advancing part of the fœtus against the torn vessel. But as the hæmatoma grows, labour is more and more obstructed till it may actually be arrested. This consideration must largely determine the treatment. Three courses are open:

(1) Incision of the hæmatoma on its inner side.

(2) Episiotomy on the opposite side of the vulva.

(3) Incision of the hæmatoma through the skin.

Any of these measures will provide the requisite room for the progress of labour, which must be completed as soon as possible to avoid serious loss of blood. The objections to episiotomy on the healthy side are that it leads to rupture of the hæmatoma into the vagina, and that it does not lead to arrest of the hæmorrhage. This is deferred till after labour. The advantage of incising the hæmatoma through the skin is that a passage for the escape of effused blood is made away from the genital canal. This method also gives the operator a chance to ligature a bleeding vessel, and even if he fails to find it he can always arrest the hæmorrhage by plugging. The bleeding point is, however, seldom found, even when a big incision is made. The advantage of a wide incision (episiotomy) on the inner side of the hæmatoma is that it usually enables the operator to locate the bleeding spot if this is in the vulva. In two of their cases the writers adopted this procedure, and they had no difficulty in finding and securing the bleeding vessel. Such an operation wound may safely be closed at once. And if no bleeding point can be found, it is still possible to arrest the hæmorrhage by plugging. This procedure is, therefore, the best of the three. In suturing the parts invaded by effused blood, care must be taken to secure a large amount of the tissues in each suture so that the spaces vacated by the removal of blood may be obliterated. When the swelling is still considerable after the hæmatoma has been incised, it is well to keep a thick drainage-tube in the vagina to assure escape of the lochia.—*Ugeskrift for Laeger*, p. 1254.

The Prevention of Post-Anæsthetic Vomiting.—S. J. Cantor has found the following simple treatment, which appears to be new, almost always successful in preventing the vomiting that frequently follows administration of a general anæsthetic. It was tried first on several hundred patients at the First Australian General Hospital during 1915, and since in both military and civil practice. Whether signs of impending vomiting, *e. g.* swallowing movements, are just appearing, or vomiting has already occurred, the treatment is the same. The nostrils are firmly squeezed with the fingers, so as to occlude the airway. The vomiting movements immediately cease. There also results a deeper narcosis, as evidenced by a less active reflex, and often slight cyanosis. If this is marked, the lower jaw must be pushed down to give an airway by the mouth. In a few cases it is necessary to free the nostrils momentarily till a breath is taken, to prevent severe cyanosis or deep narcosis.

As a result of the pressure on the nostrils, the vomiting movements cease. The pressure can then be released. In some cases, especially when ether has been given, a small quantity of salivary secretion and mucus is regurgitated from the region of the pharynx, but actual vomiting rarely occurs. At times the procedure has to be repeated if vomiting tends to recur.

The method probably acts by rapidly superadding a carbon dioxide narcosis to the anæsthetic narcosis, but the action is so rapid that there may be a direct reflex action of an inhibitory character. Neither stimulation nor pressure applied about any portion of the face prevents the vomiting. The former hypothesis, therefore, is the more likely. No ill-effects have occurred, and in almost all cases vomiting, especially that occurring before the patient has left the operating-table, can be prevented.—*Med. Journ. of Australia*, p. 299.

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CHRONIC DISEASE OF THE APPENDIX.*

By CHALMERS WATSON, M.D., F.R.C.P.Edin.,
Senior Assistant Physician, Royal Infirmary, Edinburgh; Lecturer on Clinical Medicine, University of Edinburgh.

LADIES AND GENTLEMEN,—I propose to invite your attention to-day to the subject of chronic diseases of the appendix or of the appendix region, and to illustrate the clinical features of that condition by a series of cases which are at present in my ward.

Appendicitis is a common ailment. It is, to a very great extent, a new disease. Twenty-five years ago there were few cases of acute appendicitis, or, as it was then called, perityphlitis, in this infirmary or in other general hospitals in the country. At the present day there are probably 50 or more cases for every one that then presented itself, and this increase is general throughout the country. The increase is not explained by any greater proficiency in diagnosis. The true explanation is not quite clear. The increase is probably due to a variety of factors, one of the more important being the much greater use of artificially preserved foods of various kinds, which in some way modifies the bacterial flora in the bowels in a manner favourable to an acute local bacterial affection.

I am not, however, concerned to-day with acute disease of the appendix, but with chronic disease. This is of at least equal importance, because it is extremely common, because it induces disease of a far-reaching nature, and because it is often undetected. I want, you, therefore, to take away from this lecture the following important lessons:

* Clinical Lecture delivered at the Royal Infirmary, Edinburgh.

(1) The great frequency of chronic focal disease in the appendix region.

(2) A knowledge of the diseases which simulate it, or may be associated with it.

(3) Recognition of the means by which its diagnosis can be made with reasonable precision.

The Pathology of the Condition.

At the outset I will refer briefly to the pathology of the condition. What is the condition present in the ileocæcal region in the type of case which I am going to illustrate to you to-day? Depending upon the stage of the disease there may be alterations in the appendix, in the cæcum, in the adjoining mesentery, and in the terminal coil of the ileum. The appendix itself may be dilated, it may contain concretions or putrid bowel contents, it may show chronic catarrh; its walls may be atrophied or hypertrophied; it is frequently kinked and bound down with adhesions. The slight pain which is frequently present in the ileocæcal region in such cases is due to the muscular contraction of the diseased appendix in its effort to get rid of some retained contents. The cæcum is often found dilated and prolapsed, with adhesions extending from it to the abdominal wall—so-called Jackson's membrane. The terminal coil of the ileum may be dilated and kinked, due to the presence of adhesions which involve it at the pelvic brim, producing a characteristic kink in the ileum at that point. In some cases there is, in the adjoining mesentery, an old tuberculous gland with adhesions involving the ileum or appendix. In cases of long standing there is frequently an associated general stasis of the whole colon, and a downward displacement of the whole viscera of the abdomen—visceroptosis, a condition which is frequently the direct result of the local disease in the ileocæcal region.

A series of specimens were shown from the Surgical Museum in the University illustrating the common pathological conditions described in the lecture.

Other Clinical Conditions Associated.

There are other pathological and clinical conditions which are frequently associated with chronic disease of the appendix region. Of these the more important are:

(1) Duodenal ulcer.

(2) Gastric ulcer.

(3) Gall-stones.

(4) Advanced intestinal stasis and visceroptosis, to which reference has already been made.

For many years now it has been generally recognised that a large proportion of duodenal ulcers are associated with, and arise as a late result of, chronic disease of the appendix. The combination of the two is now a well-established fact in clinical medicine.

The association of a typical gastric ulcer with chronic disease of the appendix is less common, but chronic disease of the appendix is one of the commonest causes of "indigestion," in which the symptoms closely simulate gastric ulcer. So much is this the case that the term "appendicular dyspepsia" is applied to this condition.

Gall-stones arise as a result of a catarrh of the lining membrane of the gall-bladder, due to ascending infection by bacteria from the bowel. The existence of chronic focal disease in the appendix region predisposes in a marked degree to duodenal catarrh with secondary gall-stone formations.

An interesting question arises as to how chronic disease of the appendix and its neighbourhood gives rise to duodenal catarrh, duodenal ulcer, gastric ulcer and cholangitis with gall-stones. Our present knowledge does not enable us to make a final statement on this point. Examination with the X rays commonly reveals the undue retention of the intestinal contents in the terminal coil of the ileum, in the cæcum and colon, and in the appendix. The careful examination of these cases on the screen frequently allows of a definite opinion being arrived at as to the presence of adhesions involving the terminal coil of the ileum, or more commonly alterations in the size of the appendix in whole or in part. It is frequently possible to get clinical evidence by the screen of a condition of pathological kinking in the appendix of a kind which is commonly seen at operation. It is probable that the appendix acts prejudicially in these cases in two ways: Firstly, in virtue of the putrefaction which takes place in its lumen with the associated toxæmia arising from this; and, secondly, it acts as a reflex cause of spasm of the ileal sphincter, which aggravates, if it is not largely responsible for, the ileal stasis. The associated constipation

also exerts an important influence. The conditions present afford an excellent example of vicious circles. The ileal stasis exerts a profound drag on the duodenal junction, thus accounting for the pain experienced on pressure to the left of the umbilicus, and this in turn pulls down the pylorus, this stretching the gastro-hepatic ligament, thus accounting for the pain often present in the epigastric region to the right of the middle line in these cases. The altered conditions thus induced in the bowel are highly favourable to pathogenic action of the normal intestinal flora, which manifests itself either in the form of a definite local lesion of the nature of an ulcer, or cholangitis, the result of ascending infection.

The Clinical Features of Chronic Disease of the Appendix.

I will now refer to the clinical features induced by chronic disease of the appendix. The symptoms are of the most varied type. They are in the main those of—

(1) A local nature: Pain and other symptoms of digestive disorder arising from disturbance of the secretory and motor functions of the stomach, small and large bowel, induced by the focal disease in the appendix area, and—

(2) Symptoms of a general nature: A general toxæmia arising from disturbance of the nutrition of the blood, the nervous and muscular systems. The symptoms may be those of "neurasthenia," and are often so regarded, the source of the neurasthenia being overlooked. In other cases the symptoms are those of what is popularly termed "indigestion," with general malnutrition and considerable disturbance of the general health. In other cases the condition may pass the stage of toxæmia and become a true bacterial infection, *e. g.* a definite arthritis of rheumatoid type, of which a typical example will be shown to you. In all cases of long standing the clinical condition tends to be aggravated by existing constipation with proptosis of the viscera, to which reference has already been made. We have in this condition a very typical example of what is known as a vicious circle in disease. The general symptoms are best given with reference to the cases to be shown to you.

In the first place I will show you a typical example of the disease in a patient who is now convalescing after operation.

Jessie G—, æt. 52 years, complains of (*a*) pain in the abdomen (duration, 5 years); (*b*) sickness, intermittent (5 years); (*c*) rheumatism (many years); (*d*) bad circulation.

About 5 years ago patient began to complain of pains in the lower part of the abdomen, chiefly in the middle line and to the left side, but sometimes referred to the epigastric region and the right ileocæcal region. Pain was accompanied by peculiar nausea, which was occasionally terminated by vomiting. Pain became worse, with intermissions, and was only partially relieved from time to time by a course of light diet and various medicines. Her vigour was much reduced; she suffered from cold extremities and peculiar prickly feelings in the fingers. She complained that when sewing she did not feel her needle properly, and when reading could not readily tell whether she was turning one page or several. For many years she had been troubled with constipation of a marked degree. Appetite was poor and variable. Pain in the abdomen was not apparently influenced by taking of food. The previous history showed she was subject to sore throats, took colds readily, and as a young woman was troubled with indigestion.

On admission patient was thin, anæmic, and in an asthenic condition. Her weight was 7 st. 6 lb., being a stone below her normal. On examination the abdomen was voluminous and muscle very flabby. Its movement was defective on respiration, and there was distinct splashing in the ileocæcal region on the right side, with slight tenderness on pressure in a localised area. Bowels were constipated, and intestinal lavage showed the bowels to be in a condition of chronic putrefaction, the wash-out being offensive and containing excessive mucus. The tongue was clean, the teeth and gums were healthy. X-ray examination showed a marked ileal stasis, with very pronounced colon stasis, and proptosis of the transverse colon. Other systems were normal, with the exception of weak pulse and feeble heart-sounds.

A course of medical treatment, including rest, careful dieting, tonics and massage failed to effect any marked improvement, and as the local tenderness in the ileocæcal region persisted, operation was recommended. At the operation Mr. Graham found an elongated, tortuous and hypertrophied appendix with an enlarged tuberculous gland in the immediately adjacent mesentery. Those were removed.

The general condition of the patient is now—6 weeks after operation—greatly improved, and she feels herself in better health than she has been for many years. Her colour and her vigour are greatly improved, and she has lost all pain and sickness. She still complains of the prickly feelings in her fingers, the result of a toxic neuritis.

The symptoms in this case are clearly the result of two main pathological conditions—the appendix and the colon. The case illustrates the combination, which is frequently found, of disease of the appendix of old standing associated with elongation, dilatation, and downward displacement of the transverse colon. The full effects of the treatment will not be obtained for at least 2 to 3 months, during which time very special care must be taken to regulate the bowels and improve the condition of the abdominal muscles by judicious massage and exercises. There is no reason to doubt that, with a continuation of treatment directed to still further improve the tone of the abdominal and intestinal muscles, she will continue to feel what she is already describing herself as—a new woman. The case illustrates the clinical features resulting from chronic disease of the appendix associated with colon stasis. The next case is of a simpler and more straightforward nature.

Arthur C—, æt. 30 years, electric wireman, complains of (1) pain in the abdomen, and (2) occasional dizziness, of 15 months' duration.

Pain developed for the first time 15 months ago, after an attack of constipation. The pain is located below and to the right of the umbilicus. It lasts for about 10 or 15 minutes as a rule, is sometimes sharp and sometimes dull; it has no relation to food. The patient describes the pain as occasionally commencing in the region of the umbilicus and passing downwards to the right iliac fossa. The pain may disappear for a few days. The dizziness is worse in the mornings. He sleeps well, has a good appetite, and is otherwise in good health. There is no noticeable loss of vigour and no appreciable loss in weight.

On examination patient is a small man, of indifferent nutrition and a fair colour. The abdomen appears slightly distended in its lower part, and shows defective abdominal movement. There is marked pain on pressure in the ileocæcal region, as indicated in the sketch (Fig. 1). Splashing is sometimes recorded in the region of the cæcum

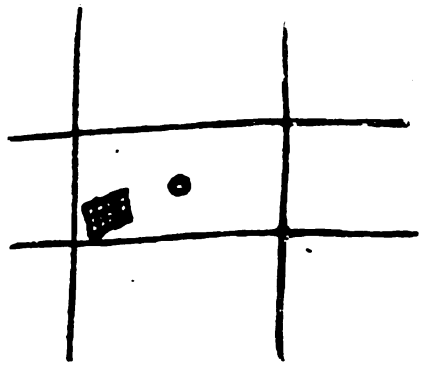

FIG. 1.

and also of the stomach. The stools are constipated and offensive in odour. Other systems were normal. X-ray examination reveals no abnormal condition of stomach, ileum, or cæcum.

The diagnosis of focal disease of the appendix is determined by the situation and nature of the pain, by the fact that it is not influenced by food, and by the constant presence of the localised area of tenderness on deep pressure. Ten days' observation and treatment has sufficed to eliminate the possibility that simple constipation is the cause of the irritation in the appendicular area.

This is a typical case of chronic disease of the appendix in its early stages. With the exception of the slight disturbance of the circulation revealed by the dizziness, there are no symptoms of a general toxæmia such as are usually present in the later stages of the disease.

At the operation Mr. Thomson found a greatly elongated appendix, retro-cæcal in position, with an enlarged bulbous end.

The next patient is a young woman with symptoms pointing to chronic disease of the appendix, in which gastric symptoms are more pronounced:

Caroline W—, æt. 25 years, jute spinner, complains of (1) pains in the stomach region, (2) nausea and vomiting, (3) diarrhœa (duration, 9 months).

The symptoms began early in January, 1918. She was off work for over 3 months, resuming in April. The condition, however, becoming aggravated in the latter end of May, she was compelled to cease work in early September. Recurring abdominal pain was the chief symptom. It was referred to the right side, being at times most pronounced in the ileocæcal region, and at other times in the right hypochondriac region, the latter region being painful when touched. She

also complained of general tenderness of the whole abdominal wall, especially during stooping. She has frequently vomited, this taking place shortly after food, and especially after a meat meal. Diarrhœa was troublesome for a few weeks before admission.

Her family history is not very good. Her father died of pneumonia, æt. 45 years; her mother died of influenza, æt. 37 years; and one brother died of pneumonia, æt. 20 years. Personal habits satisfactory.

On admission patient is of indifferent nutrition and rather delicate in colour; her weight is 7 st. 11 lb., against her normal of 9 st. 7 lb. Her appetite is fair, but there is occasional nausea during eating, and disinclination for food. Frequently there is a feeling of pronounced discomfort after food. Abdominal pain is general, but is located chiefly to the right hypochondriac region. The bowels are loose and motions offensive. The teeth and gums are healthy, the tongue heavily furred. The abdomen is somewhat flat, and shows little or no movement on respiration. There is marked rigidity of the abdominal wall, which is tender throughout, with localised areas of pronounced pain on deep pressure in the right ileocæcal region, to the left of the umbilicus, and in the epigastric region, as shown in sketch (Fig. 2).

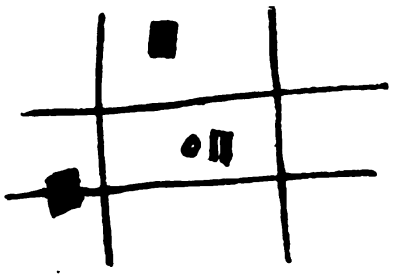

FIG. 2.

Other symptoms appear normal; there is no pelvic disorder.

The chronic history given above points clearly to some organic disorder of the abdomen. This may prove to be either of the nature of a gastric ulcer or chronic disease of the appendix. The fact that pain is frequently complained of after food, with pronounced nausea during eating and frequent vomiting soon after food, is rather in favour of a gastric ulcer, but all these symptoms are not infrequently present in cases of uncomplicated appendicular disease.

The diagnosis of chronic disease of the appendix, on the other hand, is favoured by the general rigidity of the abdomen, by the area of distinct tenderness on pressure in the ileocæcal region and associated areas in umbilical and epigastric areas, and by the presence of diarrhœa due to an irritative catarrh of the colon, which is frequently present in cases of chronic disease in the appendicular area. It is possible that at the operation we may find evidence of disease of the stomach as well as of the appendix.

The patient changed her mind regarding operation, and left the hospital, all her symptoms being markedly relieved.

In an earlier part of the lecture I pointed out that the focus of septic mischief in the ileocæcal region was sometimes the starting-point of marked arthritis. The following is an illustrative case:

Mary M—, æt. 17 years. Complains of (*a*) pains in the knees, shoulders and elbows (5 weeks' duration); (*b*) pains in the wrist (3 days' duration).

About 5 weeks before admission patient got a chill as a result of working in the fields in wet weather. This was followed by painful swelling of the knees, shoulders and elbows. She continued work for a fortnight, but after that she stayed at home and was treated by her doctor. The wrists became involved 3 days before admission to hospital on September 22nd. Patient had suffered from measles 4 years ago and has also had influenza. She has otherwise enjoyed good health. Her diet has included a too liberal use of tea.

On admission nutrition was rather poor, and she was pale, with marked chronic blepharitis in both eyes. The wrists, knees and elbows were slightly swollen and painful on pressure and on movement. Skin was moist and warm. There was a slight elevation of temperature which lasted for 2 days. Pulse was 100, respirations 26. The heart was slightly enlarged, the first sound in the mitral and aortic areas being prolonged and unduly soft. The bowels were constipated; the abdomen showed no movement on respiration. There was marked rigidity in every area, and marked pain was complained of on pressure in the ileocæcal region and to the left of the umbilicus, as shown in the sketch (Fig. 3).

The tongue was covered with whitish fur. The teeth and gums are in a satisfactory state. The stools are constipated and unduly offensive.

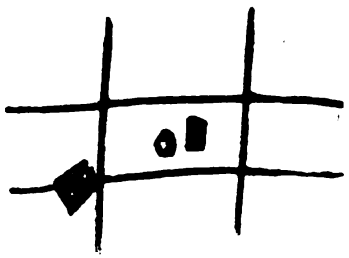

FIG. 3.

X-ray examination showed after 5 hours some retention of bismuth in the stomach and delay in the passage of food through the small intestine. Other systems appear normal.

Under complete rest in bed, the use of blankets, the use of aperients and large doses of salicylate of soda the patient's condition improved. The pains yielded very slowly to the salicin drug, this revealing the fact that we were not dealing with a pure case of acute rheumatism, but rather with an acute form of rheumatoid arthritis. The abdominal condition above described persisted.

The condition of (*a*) the rigidity of the abdominal wall, (*b*) the localised areas of tenderness in the right iliac region and to the left of the umbilicus, associated with (*c*) the condition of excessive putrefaction of the stools, point clearly to some focus of infection in the appendix area. This is in all probability the primary form of the bacterial infection which is causing the general rheumatoid arthritis. This disease is essentially curable in its earlier stages if the source of the infection is ascertained and appropriate treatment applied.

The patient developed a mild attack of acute appendicitis after being transferred to the surgical side. At the operation Mr. Dowden found marked evidence of old and recent disease of the appendix.

The next case illustrates the clinical features arising from chronic diseases in the appendix region, possibly of tuberculous origin.

Mary P—, æt. 25 years, forewoman in factory, complains of (1) diarrhœa (duration, 6 months); (2) swelling in abdomen, intermittent (6 months); (3) sickness, occasional (6 months); (4) pains in the abdomen.

Six months ago diarrhœa set in, the bowels moving 5 or 6 times daily. Three weeks later blood of a red colour appeared in the stools, and shortly afterwards she experienced a severe attack of abdominal pain located chiefly to the umbilical and right iliac regions. The attack lasted 8 hours, and the pain recurred at intervals. The pain has recurred frequently since, usually when the diarrhœa was present. The abdominal pain, sickness and diarrhœa had no relation to food Her weight on admission (July 22nd, 1918) was 5 st. 8 lb., her normal weight being 8 st. 4 lb.; her present weight is 6 st. 7 lb.

Under a course of rest, milk *régime*, occasional dose of sedative given by mouth, later, tonics and more liberal diet, patient improved materially in appearance and strength, and gained a stone in weight. Recently there was a recurrence of the symptoms—abdominal pain and diarrhœa with blood in the stools, with pronounced rigidity of the abdominal wall, and pain on pressure in right iliac region.

You will observe that the patient is a thin, poorly-nourished, pale woman, with black rings under her eyes. Temperature normal; pulse-rate ranges from 80 to 100; respirations, 20. There is a general fulness of the abdomen in its lower part, with rigidity of the abdominal wall, and marked pain on pressure in a localised area in right iliac region, as seen in sketch (Fig. 4).

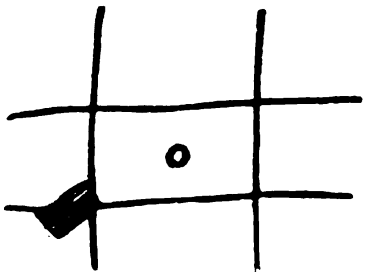

FIG. 4.

Tongue is flabby and slightly furred; teeth and gums are satisfactory. Stools are markedly offensive and contain excess of mucus. No blood at present.

X-ray examination after 6 hours reveals a rate of movement of bismuth contents slightly above the normal rate; after 24 and 48 hours there is considerable colon stasis. Other systems apparently normal. Pelvic examination negative.

The rigidity of the walls of the abdomen indicates some irritation of the peritoneum or other structures; the continual presence of a localised area of tenderness in the right iliac region suggests that the root of the mischief is

to be found in the appendix or adjoining structure. The history of the diarrhœa and blood in stools suggest that the mischief may be primarily tuberculous. The precise nature of the condition will be determined at the operation.

At the operation Mr. Scot-Skirving found marked adhesions constricting the appendix about its middle, the peripheral end of the appendix being enlarged, with thickened walls, and showing considerable congestion of vessels.

The last case is one which shows from the history clear evidence of a gastric ulcer, probably associated with chronic disease of the appendix.

Agnes M—, æt. 51 years, complains of (1) pain in the stomach region radiating through to the back (duration, 7 years); (2) vomiting of coffee-ground material (7 weeks); (3) loss of weight and vigour.

Seven years ago the patient experienced pain after eating associated with heart-burn. The first passed off quickly, but later tended to continue for longer periods. Seven weeks before admission the symptoms became aggravated, and she vomited a very large amount of coffee-ground material. Her doctor reports that this hæmorrhage was very severe, and was associated with melæna.

She lost vigour and also weight, her present weight being 9 st. 10 lb., as against 13 st. Her health previous to the present illness has been fair.

She was liable to sore throats with ulceration, and troubled with hæmorrhoids. Her vigour was considerably impaired. She suffered from severe constipation for the last 15 years.

On admission patient was a pale, fairly well-nourished but flabby woman. The teeth are in a satisfactory state; the gums showed a moderate degree of pyorrhœa. The tongue is clean, but somewhat raw and irritable-looking at the tip and the edges. The abdomen is prominent, the abdominal wall well clothed, but soft and flabby. There is gurgling on pressure in the ileocæcal region. There is localised tenderness on pressure in the right ileocæcal region and in the epigastric area to the right of the middle line (Fig. 5). The motions are constipated and markedly offensive, containing excessive mucus. Pulse is rather soft and flabby, and the blood-pressure is appreciably increased. Other systems normal.

Under a course of rest, milk *régime*, and careful regulation of the bowels the acute symptoms have

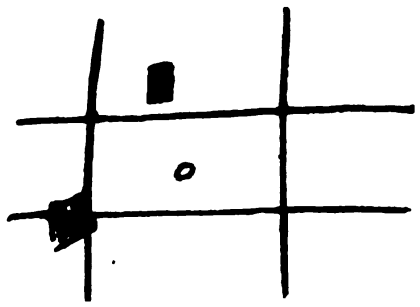

FIG. 5.

passed off, and she is now free from pain and sickness and other symptoms. The tenderness on pressure in the abdominal area has persisted.

The clinical history points clearly to a gastric ulcer, revealed by the prolonged history of pain after eating and hæmatemesis. This condition is complicated by marked constipation. The persistent presence of tenderness on pressure in the ileocæcal region points to the existence of a focal lesion in that area, probably involving the appendix. It may be that this is of very old standing, the gastric ulcer being secondary to this. It is of interest to note the patient's liability to ulcerated sore throats. This condition is not infrequently present in patients when health and resistance is undermined by some chronic latent source of septic infection in the appendix or elsewhere.

In view of the relief of symptoms experienced by rest and other medical treatment and home conditions, the patient decided to go home and come back later for operative treatment.

The study of the above cases shows the widely different nature of the symptoms which may arise from primary disease of the appendix and its neighbourhood.

The great variety of the symptoms and clinical conditions which may be met with in chronic disease of the appendix will be better understood by dividing the cases into groups:

(1) Cases of simple and uncomplicated chronic diseases of the appendix associated with few symptoms of general malnutrition and toxæmia. A good example of this group was the man shown to you to-day, the distinctive features of his case being recurring attacks of abdominal pain, chiefly involving the right side, bearing no relation to food, and associated with a definite area of pain on pressure in the ileocæcal region.

(2) Cases in which the symptoms are aggravated, and sometimes masked, by the existence of a duodenal ulcer, a gastric ulcer, or, more rarely, gall-stones. I pointed out to you that these conditions frequently arise as a late result of chronic disease of the appendix and its neighbourhood. In this group of cases the general symptoms of disturbance of nutrition and toxæmia are more pronounced, but the clinical features are largely those involving the digestive tract.

(3) Cases in which the symptoms are of a more general kind, the clinical picture being that of general neurasthenia, rheumatism, or other disorder, there being no very pronounced symptoms of digestive disorder. Close inquiry in these cases will usually reveal the existence of digestive disorder in the form of constipation, slight abdominal disorder, with derangement of stools.

Such cases are apt to be regarded as neurasthenia or rheumatism, and the existence of a focus of chronic disease in the appendix is overlooked. Neurasthenia and rheumatism are frequently of toxæmic origin, and one of the sources of the toxæmia is in the appendix. That is one of the lessons that I wish to bring home to you to-day.

(4) A fourth group is arthritis. I showed you to-day a typical case of acute rheumatoid arthritis associated with clear evidence of the existence of chronic disease in the appendix region, this being only detected on objective examination. Rheumatoid arthritis is an infective disease, and the source of the bacterial infection is occasionally in the appendix region. The disease is curable in its early stages if the source of the infection is ascertained and the appropriate treatment applied.

I wish to say a few words further on the symptom of pain in this disease. This symptom is not invariably present. When present it is most frequently referred to the right side of the abdomen, and especially to the lower part. Frequently, however, pain is referred to the right hypochondriac region or the epigastric area. Less frequently it is referred to the left iliac region. This irregular distribution is doubtless associated with the different situations in which the appendix may be found. Frequently the patient may describe the pain as commencing in the ileocæcal region and passing obliquely upwards towards the stomach region. In one of the above cases the pain is described as sometimes commencing in the umbilical region and passing downwards to the right ileocæcal region. On objective examination the abdominal wall may be found badly nourished or the reverse. Pain on deep pressure is always present in one or other area, very specially in the right ileocæcal region. The second most common site is immediately to the left of the umbilicus, and the third most common site is in the epigastric region to the right of the middle line. The former is probably due to a dragging of the duodeno-intestinal junction arising from the stasis which is usually present in the lower part of the ileum in such cases. I would have you keep in view the frequency of pain in these situations and the necessity for carefully and frequently examining the patient. The stools should always be examined for evidence of chronic putrefaction, revealed by the presence of persistently offensive stools, and for the presence of colitis, revealed by the presence of excessive mucus in the stools.

I do not wish you to imagine that all cases where you find symptoms of the nature illustrated to you to-day, associated with an area of pain and deep pressure in the ileocæcal region, are necessarily cases calling for active surgical treatment. Such is not the case. Simple constipation may itself be responsible for appendicular irritation, and the symptoms may disappear by treatment directed to its correction. Repeated examination of these cases with careful observation of the results of treatment will, however, suffice to enable you to make a diagnosis with precision and determine the necessity for operative treatment.

One more word with regard to the after-treatment. It is as a rule essential, if the best results are to be obtained from the operation, to take steps later by means of massage, physical exercises and appropriate tonics to restore the tone of the intestinal and abdominal muscles. If these steps are taken, you will find a very small percentage of cases in which operative measures are not successful in getting rid of the symptoms and restoring the patient to a satisfactory state of health.

ON GUNSHOT WOUNDS OF THE PANCREAS.

By GORDON TAYLOR, M.A., M.S., B.Sc. Lond., F.R.C.S.Eng., late Major R.A.M.C.,

Senior Assistant Surgeon, Middlesex Hospital, etc.

EXPERIENCE has persuaded me for some time that, despite operation, acute disease of the pancreas is very fatal, but in cases of injury to this organ the "pre-war" literature does not altogether support such a pessimistic view. In 1903 Von Mikulicz (1) collected 45 cases of wounds or injuries of the pancreas, of which 21 were penetrating wounds, the rest contusions. Twelve wounds were of gunshot origin, and of these, 5 were submitted to operation, with 3 recoveries; the 7 cases unoperated, however, were all fatal. Of the successful cases, one was complicated by 6 wounds in the small intestine and one in the splenic flexure; all these were successfully treated by suture. Of the stab wounds, two were complicated by injuries of the stomach; one patient lived, and the other two died.

It was a matter of some interest to me on going to France in the beginning of 1917 to learn the reputed very fatal nature of injury to this organ. It has been pointed out in this war that gunshot wounds of the pancreas have been less frequent, or, at any rate, less often recognised, than those of any other of the abdominal viscera, hollow or solid, and it has been explained that the intimate relations of the gland to the large blood-vessels are such that a wound of the pancreas involves the greatest risk of an immediate and severe and probably fatal hæmorrhage; many such cases have not reached the casualty clearing hospital. In those cases which survive and come to operation it is probable that the attention of the surgeon may have been more focussed upon attendant injuries of the stomach and bowel, and that the injury to the pancreas may have been thereby overlooked; other cases may simply have been regarded as retro-peritoneal hæmatomata. Howbeit, in General Cuthbert Wallace's (2) series of 965 operated cases the pancreas is noted as wounded in only 5, and in only one of these was the patient successfully evacuated.

Sir George Makins has stated that in the few cases in which apparent wounds of the pancreas have been seen at the base it is possible that in these there was a wound of the second or third part of the duodenum, and he mentions one case, fatal on the 11th day, in which at necropsy a wound of the pancreas was found with fat necrosis of the omentum and mesentery. Two other cases are quoted by him as recoveries, but their pancreatic nature was not established beyond doubt.

The pseudo-cysts occasionally seen after contusions of the abdomen in civil life have not been seen in war. John Morley, of Manchester (3), however, recorded such a case where a shell-wound of the pancreas produced a pancreatic pseudo-cyst. The patient was hit on July 24th, 1916, and came under observation on August 14th; the cyst contained a fragment of the copper band of a shell one inch in length. He quotes a similar case from the Hungarian literature.

Several pancreatic injuries of gunshot origin have come under my own care in which a successful issue has followed operation.

CASE 1.—A private in the 2nd M.G. Batt., A.I.F., was hit by a rifle bullet on Mount St. Quentin when the Australians captured that important eminence during the Fourth Army advance in September, 1918. There was a small wound of entry in the right iliac fossa, 12 perforations of the ileum were sutured and, in addition, a resection of 18 in. of lower jejunum was performed. There was much blood in the cœlom, and fat necrosis was present all over the omentum and mesentery. A hole in the body of the pancreas was found, but at the time the missile had not been located by X rays. The patient made a good recovery, but his wound broke down rather badly, and required to be resutured. A note from England on September 28th gave me the information that his condition was excellent.

CASE 2.—A private was hit in the left flank by a piece of missile, which traversed the spleen and the body and neck of the pancreas, finally lodging in the spigelian lobe of the liver. It was removed, the pancreas drained through the gastro-hepatic omentum, and the patient made a good recovery.

CASE 3.—I had the privilege of assisting Major Curry, R.A.M.C., during the third Battle of Ypres, to operate on a patient who had been hit by a bullet in the right flank. It had traversed the lower costal arch and liver, and had lodged in the head of the pancreas; the superior pancreatico-duodenal

artery had been divided and required treatment. The patient was detained in the casualty clearing station for a fortnight, and was evacuated to the base in good condition.

I have also met with several cases in which the left end of the body and the tail of the pancreas had been injured, and which convalesced uneventfully.

Major Jack Anderson, of Dundee, and Major Saint, of Newcastle, have each had at least one successful abdomino-thoracic case complicated by an injury to the pancreas. Major Worthington, of Lowestoft, kindly gave me notes of a case of a man hit in the left side of the body by a fragment of shell in whom the liver was severely fractured and the pancreas severely damaged; the man recovered.

Colonel Mayo Robson (4) also, as early as December 4th, 1915, quoted two cases of his own, where injury to the pancreas was complicated by severe bleeding from vessels in its vicinity, and where a successful issue in each case was obtained by operation.

In the recent war gunshot wounds of the pancreas have, indeed, been fatal injuries, and *the few successful cases* here recorded are to be regarded as in the nature of the *exceptional*. Surgery, however, in some cases has had its reward.

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(1) MIKULICZ.—Quoted in Moynihan's 'Abdominal Operations,' vol. ii.

(2) WALLACE.—'War Surgery of the Abdomen,' pp. 105, 106.

(3) MORLEY.—'Brit. Med. Journ,' March 23rd, 1918.

(4) MAYO ROBSON.—*Ibid.*, December 4th, 1915.

Recurring Dislocation of Shoulder.—In Rivières case the dislocation had recurred 9 times during the year, but no cause could be discovered except that the shoulder was a little loose. This was corrected by taking up folds in the abnormally large and loose capsule of the joint with interrupted sutures, passing the threads through the subscapular muscle. This was a complete success; the young man was soon drilling with the other recruits.—*Journ. Amer. Med. Assoc.*, p. 612.

TWO CASES OF GANGRENE OF THE LUNG.

By PERCY R. COOPER, M.D., B.Sc.Lond., F.R.C.S.Eng.

CASE 1.—Female, æt. 4 years, a delicate child, who had suffered almost from birth with digestive troubles. Neither parent was robust, but there was no evidence of tuberculosis. During an epidemic of measles of unusually severe type she caught the infection, and quickly developed broncho-pneumonia. She was acutely ill for 3 weeks, during which time she showed a complete repugnance to food, and feeding became a difficult problem. Both vomiting and diarrhœa occurred and were very resistant to treatment. The surroundings were not of the healthiest, but plenty of fresh air was insisted upon. Despite the most assiduous care the child wasted rapidly, the temperature assuming a septic type, and there was marked prostration. A distressing spasmodic cough suggestive of "whooping-cough" also supervened, but without the characteristic "whoop." Instead of the physical signs in the chest clearing, several patches of harsh bronchial breathing were discernible, and these later assumed a cavernous type. During the last week the odour of the breath became extremely offensive, the prostration became severe, and the child gradually sank and died.

There could be little doubt, during this latter period, that gangrene of the lung had set in—the intolerable nauseating odour of the breath was pathognomonic, but I was able to confirm the diagnosis by necropsy. I was allowed to examine the chest and abdomen, and found 5 gangrenous cavities, varying in size from a pea to a small walnut. The rest of the lungs showed generalised broncho-pneumonia, with abundant muco-purulent secretion. The stomach and intestines showed advanced catarrhal changes, but no actual ulceration. The lymphatic glands, both mediastinal and abdominal, were enlarged and infiltrated, but showed no tubercular lesions. The heart was pale, flabby and dilated.

CASE 2.—A soldier, æt. 23 years, who was wounded in France in June, 1916. The wounds

were mostly of a superficial character, and small but scattered, owing to peppering with shrapnel.

On admission most of the wounds were healed, but there were some suppurating sinuses in the buttock, perinæum, right thigh and foot. The patient's general condition was good, and there seemed nothing to apprehend about him. By the end of July all the wounds were healed except the sinus in the perinæum and in one of the toes, where some necrosed bone could be felt. These were opened up, cleaned antiseptically, and packed with iodoform gauze, and seemed to progress quite satisfactorily. In the middle of September the toe was healed, but a small sinus still persisted in the perinæum, at the bottom of which some hard substance could be detected by the probe, which almost felt like bare bone. This was cut down upon and found to be merely thickened scar-tissue, and as it was evidently preventing healing of the sinus it was excised. The patient again appeared to progress quite satisfactorily, and the wound, which was again packed with iodoform gauze (it was before I became acquainted with Bipp), was healthy and closing from the bottom. About the middle of October the patient developed a cold, complained of facial neuralgia, and had some carious teeth extracted. His mouth became sore and he developed stomatitis and tonsillitis. He was rather depressed and not able to take his food well.

On October 17th, in the early hours, he had what was described as "a fit." He seemed to choke, and became unconscious and convulsed. I was hastily summoned to his bedside, and found him conscious but evidently very ill. I had him at once removed from the open-air ward, in which he had previously been, to a warm room. Some stiffness of the neck and jaws was noticed, and I immediately suspected he was developing tetanus. Prof. Dean, of Manchester, saw the case with me the same evening, confirmed the diagnosis, and promptly administered 30,000 units of anti-tetanic serum intravenously. This was followed two days later by another 10,000 units of serum given intrathecally. After this the patient, who had now several typical tetanic spasms, passed into a general convulsion, and became extremely collapsed and comatose. He was only kept alive by inhalations of oxygen, hypodermic injections of atropine and ether, hot stupes over the præcordium, etc. From this condition of almost complete respiratory and cardiac failure he gradually rallied, but continued extremely dyspnœic. Consciousness, which had been entirely abolished, gradually returned after about 24 hours; the tetanic spasms did not recur, but the abdominal and neck muscles were still markedly hypertonic. The patient was now able to take food and gained some strength, but the "pneumonic type" of respiration persisted; there was a very troublesome cough, and complaint of pain in the left side. On physical examination of the chest no dulness was observed, but numerous *râles* and rhonchi were heard. There was a thick, muco-purulent expectoration, which proved troublesome to expel. A bacteriological examination of the sputum showed innumerable pneumococci.

I thought at first the patient was going to recover, but, despite every care, the broncho-pneumonic condition persisted, and the breath became extremely fœtid. A diagnosis of gangrene of the lung became inevitable. The patient lived for nearly 2 weeks longer, dying about 6 weeks after the appearance of tetanic symptoms.

Comments.—It is probable that in the latter case the septic broncho-pneumonia which resulted in gangrene of the lung was caused by the inhalation of septic particles into the lung during the collapsed and unconscious stage. At the same time the lowering of vital resistance during this collapse stage probably permitted pre-existing pneumococci in the air-passages to flourish apace and eventually overwhelm the pulmonary tissue. The immediate appearance of the pneumonic rate and type of respiration upon the recovery from the collapse, and their continuance until death—*i. e.* for nearly 6 weeks—point conclusively to this view. The type of pneumonia which follows drowning is probably of the same nature and is similarly explained.

In Case 1 the child was probably already greatly debilitated by gastro-enteric catarrh, etc., and was unable to resist the strong infection of measles. The scattered gangrenous cavities may have resulted from the breaking-down of embolic patches, or may have been merely the centres of most intense infection, resulting in the necrosis of small masses of lung-tissue, which subsequently underwent putrefaction and softening.

Why the odour of putrefying lung (or necrosed laryngeal cartilage) should be so much more intoler-

able even than from gangrenous bowel has, so far as I know, not been explained; but that it is so all who have had the unpleasant experience of attending upon these cases will admit. Unfortunately, no treatment at present available seems to be of any real use in these cases of scattered gangrenous cavities in the lungs. Where there are one or two isolated cavities surgical intervention may occasionally be justifiable. No antiseptic inhalations or injections appear to be of the slightest avail, and, to my mind, creosote and similar preparations rather give an added unpleasantness to the already overpowering fœtor.

Fracture of the Neck of the Femur in Children.—David M. Greig states that Sir John Bland-Sutton refers to 2 cases of intracapsular fracture of the neck of the femur in children. He doubts if 5 examples obtained from boys or girls exist in all the museums of the United Kingdom. His doubt is probably well founded, for two reasons: This fracture is not common in children, and it is not fatal. Indeed, it is to radiographic collections and not to museums that one must look for even its existence. Nor is it safe to estimate yet its relative frequency, for it was not recognised before the introduction of X rays. The possibility of fracture of the neck of the femur in children was not overlooked altogether by the older writers, but they were misled by the absence of crepitus, and where injury to the bone was admitted it seems to have been considered a separation at the epiphysis if displacement took place. Radiography has shown that in many cases diagnosed as separation at an epiphysis there is a fracture close to the epiphysial line.

Fracture of the femur is vastly more common in children than in adults. Out of 310 consecutive cases of fracture of the femur of which the writer has notes, 193 occurred in children below the age of 10, and 34 between the ages of 10 and 20. All the other ages from 20 upwards only yielded 83 cases. But for fractures of the neck the relative frequency is reversed. Three cases occurred below 20, none between 20 and 30, only one between 30 and 40, and over 40, 35. The 3 cases of fracture of the neck of the femur in children are as follows:

Case 1.—A girl, æt. 5 years, was admitted to the Dundee Royal Infirmary, having fallen from a stair a height of 12 ft. on the previous day. The child was unable to put her foot to the ground, and complained of pain on manipulation. There was no crepitus. A radiogram showed an intracapsular fracture of the neck of the femur with no displacement.

Case 2.—A boy, æt. 2 years, fell while climbing and complained of pain in the hip and inability to walk. He was kept in bed a month, but freely handled and encouraged to try to stand. The writer then saw him, and a radiogram showed fracture of the neck of the femur with some displacement upwards of the lateral portion of the neck. There was, of course, shortening.

Case 3.—A girl, æt. 15 years, came under observation a fortnight after having fallen and hurt her left hip. She had slipped on a stair, but was able to rise and walk home. She continued to walk carefully, with some pain and lameness that evening and the following day, but since then had been in bed. She had pain in the joint and inability to fully extend, but no crepitus. Radiography showed an intracapsular fracture of the neck of the femur without displacement.

The diagnosis must be confirmed by radiography or by dissection, for a mere contusion to the hip may closely simulate fracture, as the following case shows:

Case 4.—A boy, æt. 4 years, fell from an outhouse roof on to the ground. He was unable to rise. His mother picked him up and he complained of pain in the right knee, which was skinned, and he had a contusion of the forehead. He continued unable to walk for three weeks. He was unable to stand or fully extend the thigh. There was pain at the hip, but no displacement and no crepitus. He was repeatedly radiographed, but no fracture was found. Yet it was six weeks before he was able to run about.

In the first and third cases the accident was recent and the salient symptoms were lameness and pain. In neither was there displacement at the hip nor eversion of the limb, and there was no crepitus. In the second case displacement had doubtless followed on account of the attempts to make the child bear its weight on the injured hip. The absence in children of those signs characteristic of fracture of the neck of the femur in adults must be accounted for by the physical differences between the periosteum of infancy and age, by the relative difference of the weight and size of the lower limb to the trunk in children as compared with adults, and by the ease with which a child can be moved and transported.—*Edinburgh Med. Journ.*, p. 75.

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ACUTE HÆMOLYTIC ANÆMIA.

By GORDON WARD, M.D.

THIS is not only the description of a very uncommon syndrome, but an essay in the difficulties of diagnosis under active service conditions. The patient was not seen by the writer until one month after the onset of his illness, when he was well on the way to recovery, but his statements were amplified and confirmed by a field medical card, a temperature chart for 20 consecutive days, and a full report on the cytology of the blood. From these his history can be reconstructed with a fair certainty of accuracy. The writer is much indebted to Major D. W. Carmalt Jones, R.A.M.C., for permission to make and publish this reconstruction.

The Medical History of the Case.

H. B—, æt. 34 years, a butler by profession and a soldier of two years' service, enjoyed good health until about May 10th, 1918. He then began to suffer from a slight "sore throat" and vague feelings of malaise. On May 17th he reported sick to his regimental medical officer, and it would appear that not very much was found wrong with him. On May 19th, however, the R.M.O. noticed jaundice, and H. B— was forthwith sent to a field ambulance. It will be noted that we are able to date the onset of jaundice with certainty.

From this date we are provided with a series of notes in the *staccato* style which active service compels. The notes made at the field ambulance are as follows, viz.:

> "Temperature, 103° F. at 3 p.m. Four days ill. Jaundice first noticed by M.O. yesterday. Tender over liver. No enlargement. Temperature, 102·6° F."

The time of the second temperature is not noted, and the whole is summarised in the diagnosis of "? Hepatitis." On this evidence the medical officer

of the field ambulance decided quite rightly that this was a case likely to need more prolonged treatment than field ambulances are supposed to provide. Accordingly, on the 20th, H. B— made a further journey to a casualty clearing station. In so doing he reached a unit able to give satisfactory attention and treatment to difficult cases, and, moreover, able to obtain laboratory reports from the nearest mobile laboratory. The notes provided were, however, very incomplete, although a temperature chart was kept. They are as follows, viz. :

May 20th, 1918: Took sick May 16th. Jaundice first noticed by M.O.' Vomited once. Headache. Temperature, 102·6° F. Nose bled once. Æt. 34 years. Never had similar attack. No abdominal pain. Liver and spleen not enlarged. Skin, sclerotics, and mucous membranes lemon-yellow. Tongue furred. Has an intense thirst. Weakness, pyorrhœa.

May 22nd: Delirious. Liq. arsenicalis, ℥iij.

May 23rd: Jaundice gone, leaving intense pallor. No enlarged glands. Involuntary micturition.

June 2nd: Fluid left base—friction.

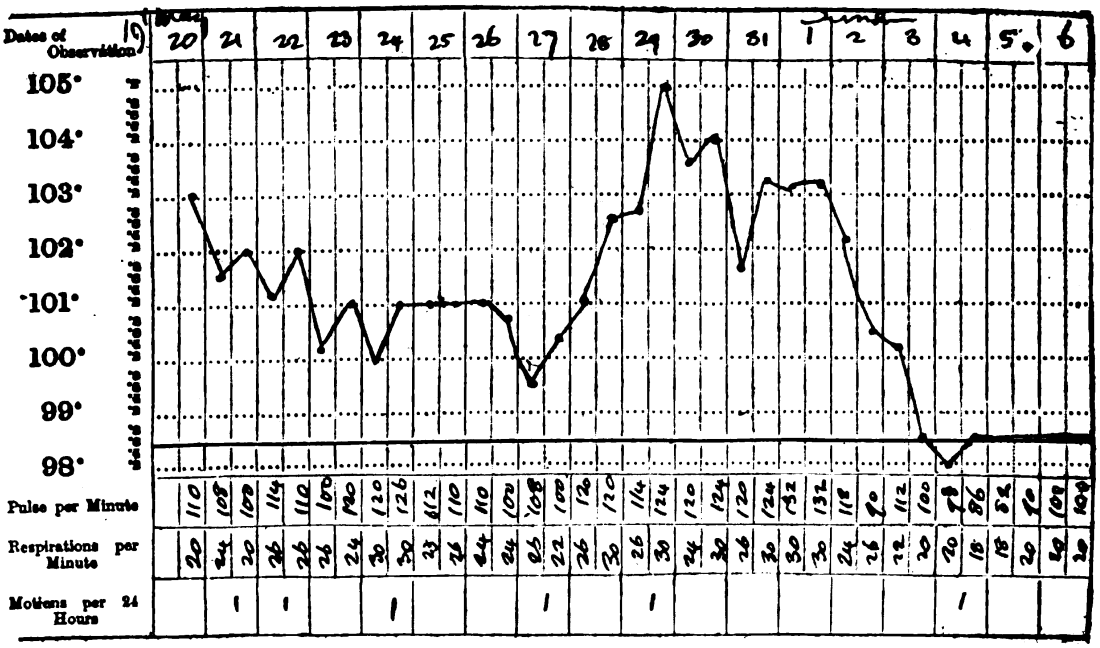
June 6th: Improved.

It is a fair deduction from these notes that the case was found very puzzling on the 20th, when he reached the casualty clearing station. One detects an attempt to exclude or discover gall-stones as a cause of the jaundice. Probably pallor was noted even at this time, for a blood examination was asked for. This was done, and a confident opinion (which the event shows to have been erroneous) given by the pathologist that this was a case of leukæmia. Hence the exhibition of arsenic, and hence also, perhaps, the lack of subsequent notes until signs of pulmonary trouble could no longer be disregarded. Once a diagnosis of acute leukæmia is made it is only too easy to attribute pyrexia and even delirium to the mystic processes of that disease.

The pathologist's report is dated on the 21st and is as follows·

"Hæmoglobin, 20 per cent. Red cells, 1,510,000. Index value, 0·66. White cells, 73,000. Red cells show anisocytosis and poikilocytosis which is not extreme. Normoblasts and megaloblasts very abundant. The majority of the white cells are myelocytes, but myeloblasts are also present."

The pathologist, in a subsequent communication, added the fact that the gums were spongy, and repeated the opinion that "the blood was typical of acute myeloid leukæmia." It is fair to state that he was suffering from influenza at the time, and was probably feeling anything but equal to prolonged work at the microscope. It may also be here pointed out that "a majority of·myelocytes" is assuredly in no way typical of acute myeloid leukæmia, although the usual finding in the chronic



form. It is the myeloblasts, which were noted only in small numbers, which dominate the picture in acute cases. We shall return to this point.

With the aid of the temperature chart we can decide that H. B— on arrival at the casualty clearing station was acutely ill, but soon began to mend. The fall in temperature strongly suggests this. Unfortunately his convalescence was interrupted by chest complications, which sent the temperature up again. The precise nature of these complications is not easy to determine, as the sole note on this aspect of the case is not altogether convincing. It is worth noting that the anæmia was not nearly so evident while jaundice was present, although we know from the pathologist's report that it was extreme two days before the jaundice disappeared. This is an old difficulty and one to be borne in mind.

On June 8th H. B— was well enough to be sent on to the Base, and arrived there labelled as a case of leukæmia. The following notes were made on admission to the Base hospital:

> "Feels better; sleeps fairly well; cough somewhat troublesome; pallor very marked. Mucous membranes very blanched; neither liver nor spleen enlarged. The left hypochondrium seems painful on palpation during deep inspiration; moist *râles* both bases. Breath-sounds bronchial, higher pitched at left base, and here vocal resonance is impaired. No glands palpable."

This was the material before the writer when he first saw the case two days later, and the whole formed a very interesting problem. The history of H. B— as revealed may be set forth as follows:

After a few days' malaise he reported sick with a sore throat. Three days later jaundice developed, and two days after that he was found by the pathologist to be already extremely anæmic. The jaundice lasted only three days. With its disappearance the temperature commenced to decline, and he seemed to be going on well when pleurisy supervened. This, however, was of short duration, and he seemed well on the road to recovery when he reached the base. We may complete the history by stating that two weeks later he had once again a rosy colour, and was sent home, to his own great content.

Major Carmalt Jones, knowing the writer's interest in leukæmia, very kindly gave him the opportunity of seeing the case, and asked for an opinion. Clinical examination added but few facts, but enabled a definite opinion to be offered to the effect that it was not a case of leukæmia. Additional confirmation of this was afforded on examination of films kindly sent by the pathologist.

Briefly, the reasons for this opinion were two: that the patient had obviously suffered from a condition which has nothing to do with leukæmia, viz. acute hæmolytic anæmia, and that he showed very few of those signs and symptoms which are typical of leukæmia.

Acute Hæmolytic Anæmia.

This condition is the state which follows the sudden widespread destruction of red cells while they are actually in the circulation. It is quite different from the anæmia which follows hæmorrhage from wounds, etc. It is best seen in certain rare conditions, such as blackwater fever and intoxication with red-cell poisons of the benzol class. It is commonly seen, but not in a very marked degree, in malaria, where every rigor produces some destruction of red cells.

The salient clinical features of this condition vary but little. The patient suffers an hæmolysis. If it is very extreme some of the hæmoglobin liberated is not immediately taken up by the spleen and liver, and in consequence appears in the urine. If it is less extreme the products of destruction are all dealt with by the organs named. In either case jaundice appears in from 24 to 48 hours after the first hæmolysis. This jaundice is due to re-absorption from a bile rendered so viscid that it clogs the smaller bile-channels. It lasts only a few days so long as the hæmolysis is not repeated. The patient suffers from the usual signs of hæmorrhage, *e.g.* collapse, profuse sweating, thirst, etc. The products of blood destruction circulating in the blood have a very marked influence on the bone-marrow. According to the degree of destruction, the latter may be paralysed and incapable of response for one to as many as eight days—all this while the patient is extremely anæmic and in a very dangerous condition. Then suddenly—always suddenly—regeneration of red cells begins. There are no clinical signs of this regeneration; but, as a matter of fact, at this time the patient commences to recover. The activity of the marrow is shown in the blood by a shower

of nucleated red cells of all varieties (known as a "blood crisis"), which lasts only a short time. After this, the new red cells are chiefly notable for their large size and abnormal staining, many being polychromatophile. All this is well known, but it is not so generally realised that the white-cell regeneration may be similarly abnormal. When this is so, we find marked increase in the number of white cells, and a moderate, but not excessive, proportion of those forms which do not in health leave the marrow, viz. myelocytes. These are not usually more than 15 per cent. as a maximum. There are also large numbers of immature polymorph cells, *i. e.* cells in which the chromatin network and granulation are typical of the polymorph, but the nucleus is not as yet nearly so convoluted and lobed as in the adult cell. Both by their size and the characters of the nucleus these cells are easily differentiated from myelocytes.

It is necessary to anticipate here to the extent of saying that examination of films showed the patient's blood was of this regenerating type when it was examined by the pathologist on May 21st. It is possible that he included immature polymorphs as myelocytes in a hasty survey, made the more easily pardonable by his illness.

The spleen and liver are commonly acutely enlarged during the period of jaundice, but soon regain their normal size. It would be more exact to say that this enlargement appears about 24 hours before the jaundice, and reaches its maximum with the onset of jaundice.

The writer is of the opinion that H. B— suffered from such a hæmolytic anæmia for the following reasons:

(1) He had profound anæmia early in his illness, for jaundice and blood regeneration were already present on May 21st—4 days after he reported sick. Although this anæmia is not specifically noted until later, the fact that a blood-count was asked for is evidence of it, as well as the result of that count.

(2) He had a jaundice of only 3 days' duration, for which no other explanation is forthcoming.

(3) He is noted as having at least one of the symptoms of hæmorrhage, viz. intense thirst.

(4) The condition of the blood and the subsequent course are exactly what one would expect in this condition, and would be extremely unusual in any other.

The only real reason against this view is the absence of definite enlargement of the spleen. The liver was, however, noted to be tender, and there was, although long subsequently, pain in the splenic region. Moreover, the left-sided pleurisy is strong presumptive evidence of some splenic trouble on that side, as witnesses its frequent occurrence in splenomegaly, from any cause.

Leukæmia: What it Really Is.

Before dealing with the absence of signs of leukæmia in this case, we must be certain that no doubt attaches to our conception of what actually takes place in the hæmopoietic organs in that disease.

Leukæmia is not a disease only of the spleen, or the marrow, or the lymph-glands, but of all lymphoid tissues (using that term in the widest possible sense), wherever found. It is not always remembered how very widely spread these tissues are, including even in health, besides those named, the thymus and the extensive tissues of the alimentary system. In disease they are still more extensive, for it is common knowledge that beyond the borders of a malignant or tuberculous gland lesion are more and more glands that one would certainly look for in vain in healthy persons. Whence came they? From some of the foci of lymphoid tissue which pervade the whole of the mesoblast. These can seldom be demonstrated by the microscope, and it is only when called into activity beyond their wont by disease that we suspect their existence. In addition, the sites of blood-cell formation in the embryo may be revived, particularly those in Glisson's capsule in the liver and in the kidney. Finally, there is no spot in the whole of the mesoblastic tissues where actual lymphoid foci, potent to form blood-cells, may not spring up under the stimulus, whatever it be, which causes the disease we know as leukæmia. The blood changes are secondary to this general hyperplasia.

This disease is simply the outward and visible result of the activity of an unknown stimulus—in acute cases a stimulus of enormous power, in chronic cases less potent. The disease is accordingly characterised by excess of lymphoid tissues in some or all of the situations which are acces-

sible to clinical examination. Chief of these are the spleen, lymph-glands, and pharyngeal tissues. Activity of the marrow may be suggested by pain in the bones. Not infrequently the liver is enlarged. Much more rarely we find evidence of lymphoid foci in the skin in the shape of tumours of varying appearance, or perhaps in the periosteum, as in chloroma, or in the parotid glands, etc. Quite often the inner ear develops a little lymphoid tissue, and the patient complains of deafness and tinnitus—a very valuable sign in chronic myeloid leukæmia when blood examination is not possible.

But, after all, we depend most on blood examination, because there we find the cells which all these hypertrophic patches shed off. As a rule, we can accept this as a certain guide, but at times the blood-changes are absent for periods, and diagnosis is accordingly more difficult.

There follows a further point. We are accustomed to think of leukæmia as an idiopathic and certainly fatal disease. In most cases we are right But with proper understanding of what the nature of the body changes in leukæmia are, we see at once that they are, after all, only a reaction of the tissues called forth by we know not what—by the unidentified cause of the disease. Is it not possible that similar reaction should be evoked by causes which we can identify, since reaction of lymphoid tissues on a small scale is so common a clinical finding? Certainly it is possible, and certainly, also, such cases have been often recorded—cases in which the most experienced physicians were at a loss to know why a patient who had all the signs of leukæmia should recover when some apparently unrelated condition such as furunculosis was adequately dealt with.

There are, in fact, on record at least 3 distinct types of case in which so many of the characteristics of leukæmia are found in a modified form that we are entitled to say that we are in the presence of a reaction of lymphoid tissues, differing not in nature but only in degree from that especially active reaction which characterises what we may now call primary leukæmia.

These 3 types of secondary leukæmia are:

(1) Cases of sepsis, boils, tonsillitis, etc., with enlarged glands in parts of the body unrelated to the original focus, with blood changes which may be as marked as those of primary leukæmia, and yet eventually making perfect recovery.

(2) Splenic anæmia of infancy or pseudo-leukæmia infantum, in which in particular the spleen is enlarged and myeloid, the blood approaches that of chronic myeloid leukæmia, and the clinical picture is indeed that of this disease in a child. Yet perfect recovery is often achieved.

(3) Cases in which a slow-growing cancer has metastasised to the bone-marrow. In these there may be as much as 60 per cent. of myelocytes; the spleen may be much enlarged and myeloid and the glands similarly affected. Myeloid tissue may also be found in the liver and even in the skin, etc. Here there is no recovery, but the patient dies of the cancer, not of the leukæmia.

This paper adds another type: it is not a new one. The occasional myeloid changes in malaria have long been known, and pseudo-leukæmia has been employed by many authors to cover cases of a similar type depending on other causes. It is, however, new to deliberately recognise these cases as secondary leukæmias and to employ that term. Symptomatic leukæmia is, of course, a valid alternative.

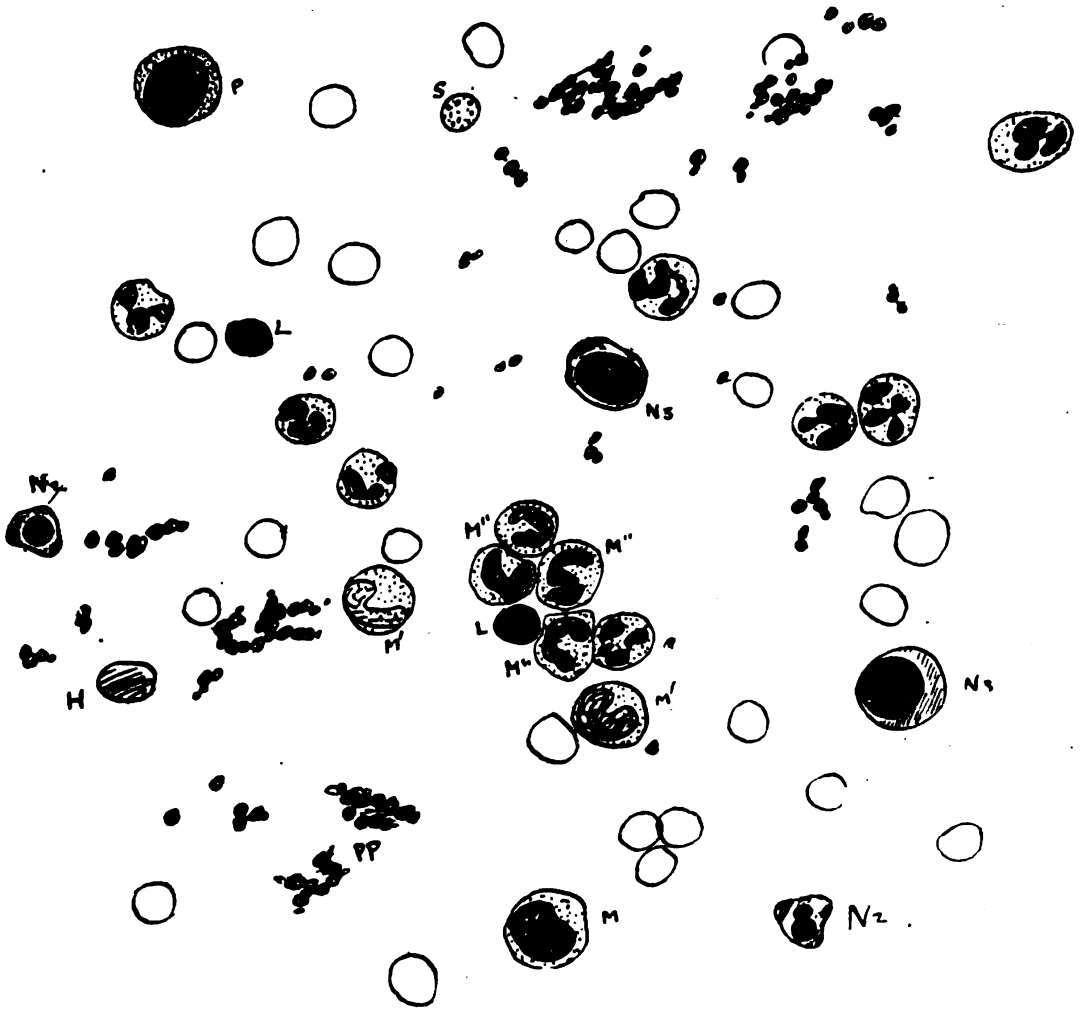
Absence of Signs of Leukæmia in the Case of H. B—.

We must remember that if H. B— is not a case of primary acute myeloid leukæmia, but is a case of secondary leukæmia, we shall expect to find very few signs of lymphoid overgrowth; indeed, they may be confined to the marrow, which we can only examine indirectly through the composition of the blood.

He actually presented the following evidences:

(1) A large leucocytosis with many myelocytes. Examination of films made out 8·4 per cent. in a total count of 73,000. This makes a total number of myelocytes of over 6000 per c.mm. This is more than the writer has found at times in cases of undoubted primary leukæmia—in which the total count of white cells has been found no more than 4–6000. This is good evidence of hypertrophy of the marrow.

(2) A reference to pyorrhœa and to spongy gums. The latter are common in leukæmia,



Actual microscopic field drawn under *camera lucida* by author. Four cells, mononuclear, drawn in from other fields. *M*. Myelocytes. *M'*. Myelocytes with convolution of nucleus. *M''*. Immature polymorphs. *P*. Myeloblasts. *N3*. Megaloblasts. *N2*. Normoblasts. *S*. A red cell with basophil stippling. *H*. A red cell showing polychromatophilia. *L*. Cells of doubtful nature and apparently devoid of cytoplasm, probably lymphocytes. *PP*. Platelets, which were everywhere in great excess.

and are due to hypertrophy and then infection of the lymphoid tissues in the mouth. However, the gums were quite healthy when he arrived at the Base.

(3) The sore throat may have been associated with some hypertrophy of lymphoid tissue.

(4) The writer detected a few enlarged glands in the inguinal regions and the left axilla, but not elsewhere.

The total of this evidence is not imposing, and certainly cannot be compared with what one would find in almost all cases of acute leukæmia. Similarly there was only a single hæmorrhage, a small epistaxis, whereas in acute leukæmia we commonly find hæmorrhage as one of the most prominent symptoms.

The Elimination of Primary Leukæmia justified.

On the evidence just set forth of the presence of an acute hæmolytic process and the absence of the usual signs of acute leukæmia, we are entitled to dismiss that disease from our thoughts as a possible diagnosis.

The re-examination of films taken when the patient was extremely ill, on May 21st, affords further justification. The actual differential count is given in the table on p. 56, and it is not necessary to refer further to its significance except to repeat that, like the clinical findings, it is just sufficiently suggestive of primary leukæmia to mislead anyone to whom the conception of a secondary and symptomatic leukæmia was unknown.

We come, then, to the conclusion that the con-

dition which was diagnosed as typical acute leukæmia was really a secondary leukæmia depending on a sudden severe hæmolysis, of which the cause remains unknown. The only explanation which has even the appearance of probability is that the sore throat was caused by a hæmolytic streptococcus, which subsequently gained access to the blood-stream. On this supposition the course of the disease was as follows:

H. B— first felt ill owing to an infection with an organism which attacked the throat. He thought little of this, and did not even report sick until the organism had reached the blood-stream and began to cause hæmolysis. Three days later the hæmolysis was already so marked that jaundice appeared. He became rapidly worse, suffering from the symptoms of severe hæmorrhage. The jaundice cleared up in 3 days. We must suppose that hæmolysis had then stopped, *i. e.* that the blood infection had been overcome. This view is supported by the fact that blood regeneration was already active by this time. He began to recover when he was attacked by the same or another organism, causing, this time, a left-sided pleurisy. This complication he overcame with but little delay, and before he left for England he was already beginning to get back the normal red complexion.

The description of the case of H. B—, æt. 34 years, is now concluded. The writer hopes that it will be observed that even in war-time it has proved possible to convey from station to station down the line sufficient of a patient's history to give the necessary guidance to those at the Base. For this no little credit is due to the authorities, and it is not amiss to acknowledge this here.

Since writing the above, the author has chanced to see the description of an apparently similar case, in which also the error is made of supposing that it was a case of primary leukæmia—although certain reservations are felt necessary. This case is published by Sellards and Baetjer in the 'Johns Hopkins Hosp. Bull.,' xxix, No. 3281, June, 1918, on p. 139, and is as follows:

"*Acute Leukæmia.*

"The patient was a man in the thirties, of rather robust constitution. The total course of his disease was only a few weeks' duration, and he came to the hospital in the last days of his illness. On admission he was *semi-comatose*, and presented at this time the typical clinical features of an advanced pernicious anæmia. There was a moderate degree of *jaundice*. The *spleen and liver were not palpable*. The blood picture, however, was by no means a simple one.

"The red cells were diminished to *1,500,000* per c.mm., and there was a proportional reduction of hæmoglobin. *Only a moderate grade* of anisocytosis and poikilocytosis was present. *Normoblasts and megaloblasts were abundant. The white count was high*, varying from 22,000 to 24,000. Of these cells about 2000 were nucleated reds, and of the remainder *60 per cent. were polymorphonuclear* in type. There were many rather *unusual mononuclear cells, but only an occasional myelocyte was seen.*

"There was nothing unusual about the platelets, either in their morphology or numbers.

"The case was clearly an unusual one, but seemed to conform most nearly to that group of acute leukæmias which tend to go over into a fairly typical pernicious anæmia.

"Direct transfusion of blood produced only a very transient benefit, and *exitus* occurred a few days after admission to the hospital."

The resemblance of this case to that of H. B—, also "in the thirties," is most remarkable. The time of this patient's stay in hospital corresponds to the first few days of H. B—'s stay in the casualty clearing station. There is the same anæmia and jaundice, the same absence of splenomegaly or enlargement of the liver. H. B— was delirious; this patient "semi-comatose." Very probably the "unusual mononuclear cells" were what are referred to above as immature polymorphs. A blood crisis was obviously present, and even the moderate degree of anisocytosis, etc., is the same.

Direct transfusion was an extraordinarily dangerous measure, for the patient was already regenerating rapidly, and there was grave risk of repeating the paralysis of the marrow which must have preceded this regeneration. Possibly this actually occurred, the transient benefit being due only to the rise of blood-pressure and increased food supply which all transfusions of blood necessarily bring about. No post-mortem details are given, nor any details of the earlier stages of the illness, corresponding to the week of malaise in H. B—'s case.

Injections were made from spleen emulsions of this case into animals, and some very interesting

results obtained, including the production of a short-lived secondary leukæmia in another animal. These, however, open too big a field for discussion, and reference must be made to the original paper.

TABLE OF BLOOD EXAMINATIONS OF H. B—.

Date	May 21st, 1918	June 10th, 1918.
R.B.C.	1,510,000	—
Hæmoglobin	20 per cent.	—
White cells	73,000	Increased.
Nucleated red cells, 2482 per c.mm.		None.
Differential count of 500 cells:		
Polymorphs	69·6 per cent.	59·8 per cent.
Eosinophils	0·2 ,,	3·4 ,,
Mast cells	0·4 ,,	0·6 ,,
Transitionals	3·8 ,,	4·8 ,,
Small monos.	16·0 ,,	26·2 ,,
Large monos.	1·6 ,,	1·4 ,,
Myelocytes	5·8 ,,	3·6 ,,
Myeloblasts	2·6 ,,	0·2 ,,

N.B.—Transitionals are the large hyaline cells of some authors and not those described as immature polymorphs in the text. On May 21st, 1918, a few eosinophil myelocytes were present, the rest neutrophil.

Calomel in Hæmorrhoids and Pruritus Ani.—F. W. Möller found many years ago an abstract from a German medical journal on the striking effects of calomel applied in powder form to hæmorrhoids. They and the adjacent skin are cleaned and dried, and the calomel is then thickly dusted on. The pain quickly ceases, and after several applications the hæmorrhoids dwindle and are converted into pale, indolent flaps of skin. Möller amply verified these claims, but he thought the matter too trivial, or the remedy too generally known, to rush into print. But when it cropped up in the correspondence columns of *Ugeskrift* he added his to the testimony of many others. One of these found the action of calomel powder on pruritus ani striking. Dusted on the anus after defæcation it forms a white lacquer, traces of which are still visible twenty-four hours later. It is not, therefore, necessary for the calomel to be incorporated in an ointment to make it adhere. Indeed, calomel ointment appears, according to another writer, to be comparatively inert. One correspondent reports the case of a colleague whose pruritus ani had persisted for years, in spite of varied treatment, including the X rays. Calomel in ointment form also proved inert, but when dusted on as a powder the disease vanished.—*Ugeskrift for Laeger*, p. 1462.

DISORDERED ACTION OF THE HEART.

By R. MURRAY LESLIE, M.A., B.Sc., M.D.,
Physician, Royal Hospital for Diseases of the Chest.

THE importance of this subject is indicated by the fact that over 10 per cent. of all the medical disabilities of discharged soldiers in receipt of pensions are grouped under the heading of heart affections—a percentage only exceeded by chest complaints and tuberculosis, which account for over 11 per cent. of the total disabilities. A large proportion of the heart cases belong to the group known as D.A.H., consisting of functional heart affections, as contrasted with true organic disease. Cases of so-called "heart strain" in civilian practice also come under the same category.

CAUSATION.

In by far the greater number of instances the condition is due to *an antecedent febrile illness in association with physical and nervous strain*. Hitherto we were all aware of the selective toxic action on the heart of the poisons of rheumatism, diphtheria and influenza, but the profession had not realised that many other infective fevers cause similar, though less pronounced effects. In a group of cases which came under my care at Bermondsey Military Hospital, the following were among the commoner antecedent febrile conditions: rheumatism, tonsillitis, influenza, trench fever, pyrexia of unknown origin, malaria, dysentery, measles, paratyphoid and septic poisoning from pyorrhœa. The exact mode of action of the bacterial toxins is undecided. Sir James Mackenzie believes that they affect chiefly the central nervous system, and that in many cases the circulatory symptoms are but manifestations of a general toxæmia. It is probable, however, that in many cases there is an actual poisoning of the myocardium, similar to the cloudy swelling and inflammatory condition of the muscular fibres of the heart found in cases of rheumatic myocarditis, thus leading to temporary or permanent enfeeblement of the myocardium, and so rendering it liable to be affected by subsequent strain. The element of strain in the soldier's heart is readily understood when one considers the physical exertion involved

in marching with the heavy packs and other impedimenta, the fatigue resulting from frequent sleepless nights, and the racking mental strain associated with the constant bombardments.

There are some, indeed, who think that strain alone may be sufficient to account for the occurrence of D.A.H., although recent investigations by Lewis and others throw doubt upon this hypothesis, and the chances are that the strain simply finds out an already impaired and damaged heart.

While on the subject of bacterial toxins in relation to heart affections, the importance of which has recently been so strongly emphasised by Mackenzie and others, it is interesting to record that as far back as 1904 my old friend and fellow House-Physician at Brompton Hospital, Dr. Lambert, of Harrow, stated that he regarded the specific fevers, *e.g.* measles and scarlet fever, as the determinants of heart-strain in schoolboys. I cannot, therefore, be too strongly insisted upon that in every case where a patient complains of heart symptoms, a searching inquiry should be made as to whether there has been any antecedent febrile condition, occurring weeks, months or years previous to the onset of symptoms, and not limit one's inquiries, as is so frequently done, to the previous existence of rheumatism, chorea, or scarlatina. A history of a mild sore throat or an influenzal attack may afford a valuable clue to the condition present, inasmuch as the degree of heart involvement is in no way proportional to the severity of the febrile attack. Thus, it is one of the commonest experiences to get a complete recovery from a severe attack of influenza or scarlatina with no heart complications, and on the other hand to meet with a very mild attack followed later by pronounced heart symptoms. In my experience this is particularly the case with young people, and is analogous to rheumatic fever in childhood, when the articular manifestations may be slight or even absent, and yet the heart become seriously affected. It seems as if during the convalescent stages of infective fevers the toxin continues to exert its malign influence on the myocardium without producing obvious symptoms at the time, and yet later the heart may be found to be impaired. This fact accentuates the necessity of great care during the period of convalescence, and there is no doubt that in many cases of influenza, rheumatism and tonsillitis the patients get up and about too soon.

As subsidiary predisposing causes, it may be well to mention the existence in some instances of *constitutional cardiac debility*. I have had one case where four brothers suffered from similar symptoms. I have frequently observed a tendency to heart weakness, generally temporary in character, in tall, over-grown schoolboys at or after the period of puberty, and these cases probably come into the category of *retarded growth of the heart*. Dr. Poynton has noted the same condition in young, large-framed soldier-recruits in the Guards' regiments, where the muscular frame seems to have outstripped the cardiac development. These cases form a certain proportion of the so-called "*adolescent hearts*." The enormous growth of the heart-muscle at puberty, particularly amongst boys, is not generally recognised. Prof. Stanley Hall states that the size of the heart nearly doubles itself at this period.

Other subsidiary predisposing causes of disordered action of the heart are a *previous sedentary occupation* before taking up the physical strain of army life, excessive smoking, and a too rapid or insufficient training in the case of young recruits. As regards *smoking*, Fisher and Berry have recently published in New York their investigations in regard to the physical effects of smoking and arrived at the following conclusions, viz.: (1) Smoking increases the heart-rate and raises the blood-pressure. (2) Smokers have a higher normal heart-rate than non-smokers. (3) Smoking delays the return of the heart-rate to normal after exercise. As the result of his experience on a Medical Board, Dr. Drinkwater, of Wrexham, stated that a particular form of functional heart disease is associated with *masturbation*—the syndrome of symptoms being widely-dilated pupils, accentuation of the heart-impulse, and a small, compressible pulse. It is, however, probable that this triad of symptoms may equally be associated with cigarette-smoking, neurasthenia, and many other conditions.

There is a large group of cases of so-called D.A.H., particularly those following shell-shock and gas-poisoning, where the heart symptoms are merely manifestations of a general *neurasthenia*, and which will tend to entirely disappear when the nervous symptoms have subsided. This neurasthenic heart is not infrequently met with in civil life, and the writer has had cases under his care with continued tachycardia and palpitation for

long periods without undergoing any gross structural change (*e.g.* hypertrophy or dilatation), as has been proved by X-ray examination after many years have elapsed. The French School and also English observers like Dr. Mott consider that the disordered action following shell-shock and gas-poisoning comes into the hysterical or neurasthenic category. I have seen many typical civilian cases of D.A.H. as the result of air-raids.

There is yet another type of disordered action of the heart, sometimes known as the *hormonic type*, and associated with *hyperthyroidism*. Sir James Barr, Dr. Florence Stoney and Dr. Hernaman-Johnson have drawn special attention to this form of functional heart affection. Sir James Barr goes so far as to state that in all cases of irritable heart there is some enlargement and increased function of the thyroid gland, although the enlargement is not always very apparent. It has been asserted that there is sometimes associated hyper- or hypo-activity of the adrenal and other ductless glands.

Before leaving the question of causation, it might be well to refer to the *acidosis theory* of Lewis, Cotton, Barcroft, Milroy and others. Lewis and his fellow-workers suggested that a condition of acidosis of the blood might be the real explanation of the dyspnœa, tachycardia and other characteristic symptoms of a soldier's heart, the theory being that the blood was deficient in the so-called "buffer salts" (sodium bicarbonate, sodium phosphate—mon-acid and di-acid—and protein), which normally combine with and fix the carbonic acid and other acids produced in metabolism. The deficiency of these salts would lead to an increased acidity, and it is well known that carbonic acid and lactic acid produced as the result of muscular exercise do stimulate the respiratory centre and cause breathlessness. This theory, though undoubtedly extremely interesting, must at present be considered as being *sub judice*.

Symptomatology.

The cardiac symptoms of disordered action of the heart are: (1) Breathlessness on slight exertion; (2) præcordial pain; (3) palpitation and tachycardia; (4) giddiness or faintness; and (5) fatigue or exhaustion. To this group of symptoms Dr. Thomas Lewis has given the name of "effort syndrome."

These cardiac symptoms are often preceded by nervous or neurasthenic symptoms, due to functional disorders of the nervous system. The most common of these are headache, general languor, nervous irritability, depression, tremors, disturbed sleep, with dreams or actual insomnia, and frequently vaso-motor phenomena (*e.g.* sweating of the palms and soles, cold hands, slight cyanosis, flushing of the skin) and increased knee-jerks. A curious, but fairly frequent, accompaniment of soldier's heart is a lymphocyte-leucocytosis (*e.g.* 10,000 to 14,000 leucocytes per c.mm.). Dr. Grace Briscoe and Dr. Levy found also that the red blood-cells were increased, often numbering 6,000,000 per c.mm.

There are one or two noteworthy points in regard to the cardinal symptoms. In the first place there is great variation in their degree and character, and most patients emphasise one, two or more of the symptoms. There is a certain tendency in the more neurasthenic cases to exaggerate their severity, and this is particularly the case in regard to the *breathlessness*. It must be remembered that the mere rapidity of breathing is not enough, and must be confirmed by the facial expression (*e.g.* the parted lips, anxious expression of the face, and working of the alæ nasi), and also by the character of the respirations. Dr. Lewis makes a point of asking the patient a question while still breathless, and finds that in genuine dyspnœa the flow of words in the patient's reply tends to be interrupted by the inspiratory movements. As regards the *pain*, it is generally referred to the region of the præcordium or just below it, and an almost diagnostic feature is that the pain often comes on quite as frequently when the patient is at rest as after exertion, and sometimes even more frequently than after exertion. This pain is often accompanied by a hyperæsthesia and hyperalgesia in the region of the præcordium, particularly after exercise, which may be localised to a small area, or be widely distributed all over the left chest. Dr. Lewis goes so far as to say that when no hyper-sensitiveness of the chest-wall is detectable after exercise, the mere complaint of pain may usually be neglected. The hyperalgesia is best elicited by pressure with the outstretched hand on the axillary and submammary regions, or by grasping the pectoral folds between the thumbs and fingers. Dr. Lewis states that if the muscles are sensitive, the patient will wince and depress his left

shoulder and alter his facial expression. It is after exertion principally that hyperalgesia is present.

Palpitation is not a symptom of much importance unless it is accompanied by persistent and excessive tachycardia. The palpitation is sometimes nocturnal. The heart-rate varies much in different cases, but is usually fairly constant for the same patient. In judging of the palpitation after exercise, Lewis recommends one of two test exercises: (1) Walk briskly up two flights of stairs (*e.g.* 40 steps), and take the pulse-rate before, immediately after, and two minutes after; or (2) hop 20 times on each foot, raising the shoulders about 9 inches at each hop, and count the pulse in the same way. In the case of a healthy heart, the pulse, after such a test exercise, will rise to 110–120 per minute, but will fall to normal usually within one minute. In D.A.H. it often rises to 140–180 per minute, and may not fall to normal or to its original rate for several minutes.

Giddiness is common, and is often described as "dizziness," or a "cloud before the eyes," and may come on suddenly when rising from the sitting to the erect posture. The patient does not complain of the objects in the room "turning round," *i.e.* there is no rotation of surrounding objects. "Faintness" is common, but actual fainting attacks are somewhat rare, although I have known of several cases. The fainting attack is usually preceded by a short interval of giddiness, and generally lasts for a few seconds or longer. I have had one post-malarial case in which the patient fainted away in the street when out "on pass."

It has already been stated that there is a tendency in many patients to over-emphasise certain symptoms. This is particularly so in regard to *fatigue or exhaustion*, and this symptom should be made light of unless accompanied by visible signs of exhaustion, *e.g.* pallor, duskiness under the eyes, tremor of the lips, or breathlessness.

Physical Signs.

Reference has already been made to rapidity of the pulse on slight or moderate exercise. There is commonly a diffuse slapping, cardiac impulse. There may or may not be evidence of enlargement of the heart to the right or to the left, as indicated by the position of the heart apex, the percussion dulness, or by X-ray evidence. There is not infrequently a soft systolic apical murmur, and fairly often a systolic basal murmur with maximum intensity in the pulmonary area. The apical murmur is generally loudest in the recumbent position, and tends to vary with inspiration. Dr. Lewis states that "the presence or absence of systolic murmurs is of no value in estimating a soldier's capacity for work, irrespective of the character, conduction, or point of maximum intensity of the murmur."

Prognosis.

A large proportion of the cases recover more or less completely, depending upon the degree of actual efficiency of the myocardium. A history of rheumatic fever or of frequent attacks of influenza, or of a prolonged febrile disorder, should make the prognosis guarded, owing to the possibility of myocardial degeneration. In a considerable percentage of instances it is extremely difficult to determine to what extent the disability is due to disturbance of the nervous mechanism of the heart, and how much is the result of actual enfeeblement of the myocardium. This is particularly the case in the neurasthenic types. It is very unfortunate if your patient has previously been told that he has "valvular affection of the heart" (or any similar label indicating serious disease), and it is very important to disabuse his mind of such an impression at the earliest opportunity, and in the most emphatic manner.

Generally speaking, the prognosis may be said to depend on the degree of response to treatment, particularly to graduated exercise. A long continuance of tachycardia and dyspnœa, with persistent præcordial hyperalgesia and continued leucocytosis, indicates a probable prolonged convalescence. Many months will elapse before such a patient is able to undertake any form of work, and it may be a year or more before he is able to undertake his ordinary duties, even in cases where there has never been any definite indication of actual disease of the heart-muscle.

Treatment.

(1) *Counteract the toxic effects of antecedent infective disorders.*—Patients suffering from febrile conditions should not be allowed to get up too soon, and patience should be exercised in the convalescent stage. The general health of the patient

must be attended to—good food and fresh air being most important. Septic tonsils or pyorrhœa should not remain untreated. In some cases it may be advisable to use bacterial vaccines if any septic or other bacterial focus can be discovered.

(2) *Psychical treatment.*—Encourage the patient by telling him that his heart is in no way diseased, and that he will eventually completely recover. A cheery doctor and cheerful companionship are important desiderata, and it is essential to prevent the patient from becoming too introspective in regard to his health. "High-frequency" electric treatment, general massage and hydropathic spa treatment are all useful.

(3) *Regular habits of life.*—There must be regular hours for meals, plenty of sleep, and avoidance of late hours, with strict moderation in the use of tobacco, tea and stimulants.

(4) *Drug treatment.*—The digitalis group of drugs is not indicated and is better withheld. A mixture containing strychnia and the glycerophosphates is often useful when there is cardiac dilatation or a definite history of strain. On the whole the writer has found bromides the most satisfactory drugs.

(5) *Judicious exercise.—Too prolonged rest is essentially bad.* As soon as possible the patient should be encouraged to take exercise in the fresh air. Sir James Mackenzie has laid down the following cardinal rule of treatment: "Let the patient indulge in his favourite exercise (*e.g.* fishing, riding, shooting, golf, etc.) so long as it gives him pleasure and causes no distress or discomfort, but let him stop or slow down as soon as he experiences a sense of exhaustion, breathlessness or pain."

Walking exercise in the open air, gardening, farm work, carpentering are all useful, ever remembering that exercise must be short of fatigue, and insufficient to cause exhaustion, breathlessness or pain. The pleasurable nature of the exercise is an extremely important point, in view of the fact that the sense of exhaustion, which is such a prominent symptom, is partly vaso-motor in origin, probably due to irritation of the central nervous system. For soldiers, drilling and games are of the greatest value, the drilling to take place for a short time each day, and the length of the time gradually increased until they are all able to undertake as much as healthy men.

Dr. Thomas Lewis, as the result of his investigations at the Hampstead and Colchester Heart Hospitals, states that the surest means of gauging capacity for physical endurance in the case of disorderly action of the heart (or irritable heart, as it is sometimes called), is to test the men upon drill, the test of capacity for work being the observed reaction to work.

Dr. Lewis's drill system may be summarised as follows:

He divides the drill exercises into 4 grades: (1) B 15; (2) C 15; (3) BC 30; (4) C 30 and D 30, the capital letter indicating the stiffness of the grade of exercise and the number the duration of the drill in minutes. Thus, B 15 consists of the simplest movements in the Army Exercise Book for 15 minutes, while D 30 includes the stiffest exercises of the Army Exercise Book, and entails 30 minutes' hard work.

The method adopted is usually as follows: The men, after arriving in the hospital, are put for a few days or a week upon B 15 and C 15. These get no outdoor passes and are not allowed to leave the hospital except under escort. Those on 30 minutes' drill are allowed free afternoon passes, a privilege which stimulates the men to get up to this stage. C 15 and BC 30 men go regularly for route marches in the early morning at a slow pace and not further than 2 miles, while the C 30 men and D 30 men march from 4 to 5 miles at a brisk pace and may engage in outdoor games.

If any man feels his drill or march too much for him he reports it to his medical officer, who also systematically sees each man immediately after he has taken the first drill of each grade and records his progress on a simple symptomatic chart. The drill instructor reports daily upon men who seem to tolerate exercise badly; otherwise, the grade is raised automatically, the medical officers waiting for complaints from the patients, or adverse reports from the drill instructor, before interfering with routine raising of the grades.

(6) As soon as the patient has got rid of most of his symptoms, it is well to encourage him to *take up his ordinary vocations* with the least possible delay, even if he is only able to take on half-time work to begin with. At all costs he must be prevented from lapsing into a condition of semi-invalidism.

In the great majority of cases one can confidently predict an ultimate complete cure, as long as the occupation does not involve any special stress or strain.

(7) In the cases associated with *hyper-thyroidism* the use of *X rays*, locally applied to the thyroid gland, has, in a certain proportion of cases, been followed by a remarkable improvement.

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SEBORRHŒA AND SEBORRHŒIC DERMATITIS (INCLUDING ACNE VULGARIS).

By H. G. ADAMSON, M.D., F.R.C.P.,

Physician for Diseases of the Skin at St. Bartholomew's Hospital.

"SEBORRHŒA," "seborrhœic dermatitis" and "seborrhœic eczema" are terms often loosely applied to various kinds of scaly or eczematoid eruptions. Strictly speaking, we know only one form of seborrhœa, namely seborrhœa oleosa, or oiliness of the skin due to excessive secretion of grease. Whether those affections which are called seborrhœa sicca, seborrhœic dermatitis or seborrhœic eczema have really any relation to seborrhœa or to eczema is doubtful. But as it is customary to employ these terms, their use should be restricted to a definite class of eruption. This subject may be conveniently considered under three headings:

(1) Seborrhœa oleosa and acne vulgaris.

(2) The so-called seborrhœic dermatitis or seborrhœic eczema.

(3) Certain eruptions which are often confused with, or mistaken for, seborrhœic dermatitis.

SEBORRHŒA OLEOSA.

Seborrhœa oleosa, the only true form of seborrhœa, gives rise to an oily appearance of the skin, particularly in certain regions, namely, the scalp, nose and naso-labial furrows, the forehead and temples, the conchæ of the ears, the central parts of the chest and back. This greasiness of the skin appears first in the years towards puberty and may continue into adult life. Its chief interest for the

dermatologist is in its association with acne vulgaris of young people, and in the possibility that it forms a basis for infection by the micro-organisms which give rise to seborrhœic dermatitis. According to Unna, seborrhœa oleosa is the result of the secretion of an oily substance by the sweat-glands, but most writers support the older theory that the grease is derived from the sebaceous glands.

Acne Vulgaris.

Acne vulgaris is a common affection which attacks young persons of both sexes. The eruption first appears at about puberty, between the ages of 14 and 17 years. The skin of the forehead and temples, of the nose and adjacent parts of the cheeks and of the chin becomes greasy, and little black plugs are seen in these regions filling the mouths of some of the pilo-sebaceous follicles. Generally a few of the black plugs become surrounded by a small red papule, which may become pustular and yellow at its apex. These three signs, greasiness of the skin, the black plugs, or "blackheads" or comedones, as they are called, and the papulo-pustules, with their distribution on the face and sometimes also on the back and shoulders and chest, in a young person at puberty, constitute the distinguishing characters of the disease. Many cases do not pass beyond this mild type, but in others the number of comedones and papulo-pustules increases, until they become so numerous as to cover the face, and in some cases the back and chest. If the "blackheads" predominate, the case is called "acne punctata"; if the papules and papulo-pustules are numerous, "acne pustulosa."

In a still more severe type, when the eruption has been prolonged over months or years, deeply seated nodules arise (acne indurata) which on puncture are found to contain pus. These nodules are made up by a fusing of several adjacent papulo-pustules. Such nodules leave scars, and one of the evils of acne vulgaris, apart from its immediate disfiguring effect, is the liability to permanent disfigurement by scarring.

Severe cases of acne vulgaris are met with in which the face and neck, and the whole of the back to the waist and the central part of the chest are the site of innumerable comedones, with repeated crops of large papulo-pustules, which may continue into adult life and lead to severe and permanent scarring.

Pathology.

According to recent researches, this distressing and common complaint of young people is due to invasion of the skin by a micro-organism called the "acne bacillus." This bacillus is not found on the skin until puberty, and it is possible that the oily secretion from hyperactivity of the sebaceous glands at this period now renders the soil suitable for its growth. The bacillus is found in dense masses in the centre of the comedo, which consists, not as formerly supposed, of dried sebum, but of concentric layers of horny cells which enclose the mass of bacilli as though in a cocoon (Fig. 1). The

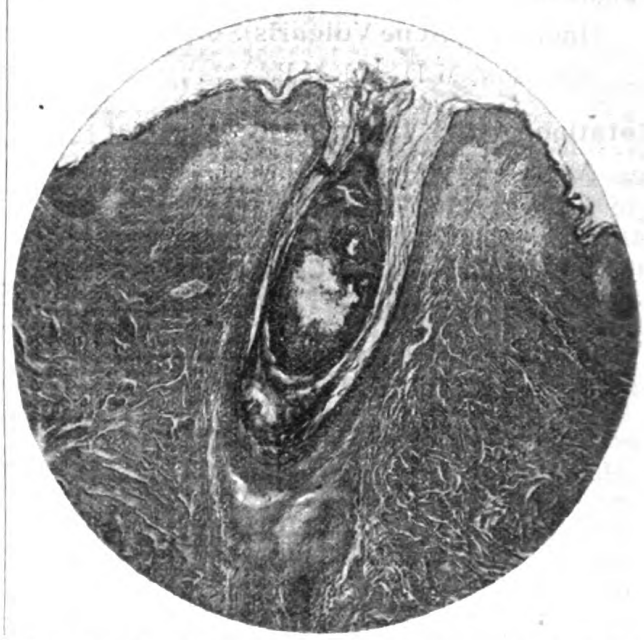


Fig. 1.—Comedo of acne vulgaris showing mass of micro-bacillus in the mouth of the follicle surrounded by layers of horny cells.

acne bacillus, as it grows in the sebum at the mouth of the follicle, leads to a defensive reaction on the part of the epidermis, shown by proliferation of the horny cells to form the encasing comedo.

Close inspection of the skin of the face in any case of acne reveals the fact that practically every pilo-sebaceous follicle in the area of oily seborrhœa is plugged with a tiny comedo, though only a certain proportion become large enough and blackened at their free extremity to be easily visible. By squeezing up the skin between the finger-nails the comedo may be expressed as a yellowish plug with a darkened free extremity, and after soaking in ether and compressing on a slide, the acne

bacillus may be demonstrated by staining with borax methylene-blue.

As to the cause of the papulo-pustule which arises secondarily to and around the comedo there is a difference of opinion. Some believe that the acne bacillus is responsible for the suppuration round the follicle as well as for the comedo, but the more generally accepted view is that the suppuration is due to a secondary staphylococcal infection, since colonies of staphylococci may be found in the infiltration in microscopical sections, and culture of staphylococcus be got from the pustules.

Diagnosis.

The diagnosis of acne vulgaris should present no difficulty. Acne rosacea and secondary syphilis give rise to papular eruptions on the face, but acne vulgaris is always easily distinguished by the presence of comedones, greasy skin, and the papulo-pustules built up around the comedones.

Treatment of Acne Vulgaris.

Many cases of acne vulgaris get well as the patient gets older and without any treatment, and often this complaint is neglected because it is supposed that the young person "will grow out of it." This is a mistake, for one never can tell how severe or persistent a case of acne may become, and severe and lasting eruptions leave disfiguring scars.

The treatment for an early mild case of acne vulgaris should consist of (1) a thorough soaping of the face at bedtime, followed by (2) rubbing and dabbing with sulphur lotion. Either ordinary soap, a sulphur, camphor and balsam of Peru soap, or perhaps best of all, a spirit soap (saponis mollis ʒiv, sp. v. rect. ʒij) may be used.

A simple sulphur lotion is as follows: Sulphuris precip. ʒss, sp. camph. ʒij, glycerini ʒij, aq. calcis ʒiv. The soaping and friction with the lotion should be done only on 4 or 5 days weekly, but it should be done very vigorously. If the skin becomes dry and peeling, an ointment—ung. aq. rosæ B. P. C.—may be applied for a few days. In cases where there are pustules, each one of these should be punctured with a finely pointed match-stick dipped in tinct. iodi, and any fresh pustules that may appear from time to time should be treated in the same way. The medical man may do this himself or instruct the patient how to carry out this daily "acne toilet." Perseverance with the soaping and sulphur lotion and the iodine to pustules will cure the majority of cases though the treatment may have to be continued for several months.

In addition to these more simple measures, we have two other methods of treatment of more recent introduction, namely, by vaccines and by X rays.

The vaccine treatment of acne vulgaris.—The treatment has not proved the success that was promised in cases of acne vulgaris. Although good results have been reported, the majority of observers have found it disappointing. It is given as vaccines of acne bacillus or of staphylococcus, or of both, simultaneously or mixed. The dose of acne bacillus vaccine is from 5 to 50 millions and of staphylococcus 50 to 1000 millions. It is probably better to use comparatively small doses, such as 10 million acne bacillus and 50 to 100 million staphylococcus, to give a dose weekly, and to avoid any marked reaction as seen by the appearance of fresh pustules and inflammatory exacerbation of those present.

X-ray treatment.—X-ray treatment is one of the most useful methods we have of treating acne. It is most suitable for early cases with greasy skin and many comedones and without much pustulation, or for long-standing cases of acne indurata with large, chronic, pustular nodules. In cases of more recent pustulation the pustulation seems to be sometimes encouraged by X-ray treatment, but in acne punctata the greasiness disappears and the comedones fall out, and in acne indurata the nodules and pustules melt away.

X-ray treatment should be employed only by an expert in its administration and in very carefully measured doses. The hair and eyes and eyebrows are covered with lead shields and the face exposed in 3 doses—one to forehead and one to each cheek. An appropriate dose is ½ pastille repeated in 3 weeks and then once or twice again after 4 weeks' interval.

Many writers lay great stress upon the treatment of acne by internal medication and dieting. Constipation, if present, must be appropriately treated and tonics may be prescribed, but little or no advance will be made unless local treatment be carried out thoroughly, regularly, and persistently. Many cases improve with a course of open-air life and exercise.

So-called Seborrhœa Sicca, Seborrhœic Dermatitis, and Seborrhœic Eczema.

Although it is not certain that these affections have anything to do either with seborrhœa or eczema, it is customary to employ such names for a class of eruptions which have the following features:

(1) They are generally—though not always—associated with a scaliness of the scalp in which the scales have a greasy aspect.

(2) They have a predilection for areas where the sebaceous glands are abundant or most fully developed, namely, for the scalp, the labio-nasal furrow, the central parts of the chest and the back, the umbilicus, and the axillæ and the groins.

(3) The eruptions consist of small or large circumscribed patches or areas, sometimes circinate patches of a yellowish-red colour, and thinly or thickly covered with soft, yellowish, moist or greasy scales. At the margins and in the neighbourhood of the patches there are usually small, red, scaly papules, suggesting that the patches are made up by a conglomeration of such papules.

(4) The scalp and the patches or areas of eruption on other parts are apt to become more acutely inflamed or "eczematised," and this inflammation may extend widely on the skin surface.

(5) There is reason to believe that these affections are of microbic origin, and this view is supported by the fact that they yield readily to mild sulphur or other antiparasitic remedies.

These affections occur in different clinical forms:

(1) Pityriasis or seborrhœa capitis.

(2) Lichen circinatus or seborrhœa corporis.

(3) Flexural seborrhœic dermatitis, which may extend to other parts.

(4) "Eczematisation" of seborrhœic dermatitis.

(1) *Pityriasis Capitis or Seborrhœa Capitis.*

The common name for this complaint is "dandruff" or "scurf." Two forms may be distinguished—one in which the scales are dry and white, the other with yellow, pasty or greasy scales. We may distinguish them by the names—"pityriasis capitis" for the former and "pityriasis steatoides" (a name given by Sabouraud) for the latter, more usually called "seborrhœa capitis."

Pityriasis capitis occurs very commonly in children from the age of 8 or 9 years. It first

Fig. 2.—Seborrhœa capitis.

appears in the form of small, scaly discs on the crown or vertex, and it may eventually extend in a uniform scaly area over the whole of these regions, usually leaving free the sides and occiput. Its very common occurrence makes it important for two reasons; first, because it so often happens that a ringworm of the scalp is overlooked and regarded as merely a "scurfy scalp"; and, in the second place, because, if neglected, it passes towards puberty into the greasy type (seborrhœa capitis), and leads eventually to early loss of hair or to liability to "seborrhœic dermatitis.

Pityriasis steatoides or seborrhœa capitis occurs towards puberty when the dry form passes into the moist or greasy form, and it may continue through adult life. At puberty the scales become thicker and yellowish in colour, with a pasty or greasy aspect (Fig. 2). In young persons this is often, but not always, accompanied by an oily condition of the skin of the face and by acne vulgaris. Such patients often lose their hair early and become permanently bald on the crown of the head, and they are also liable to the eruptions which have been called "seborrhœic dermatitis," viz.:

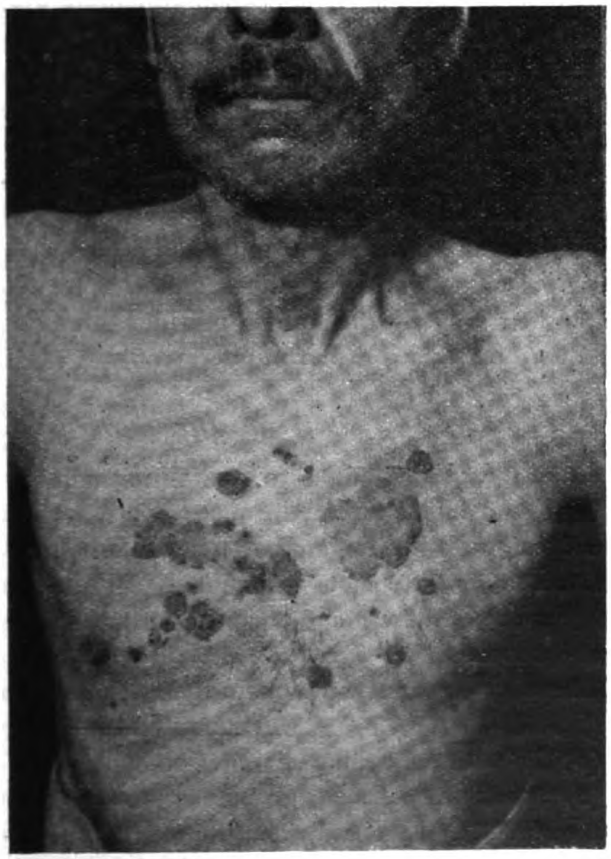
(2) *Seborrhœa Corporis or Lichen Circinatus, called also "Flannel Rash."*

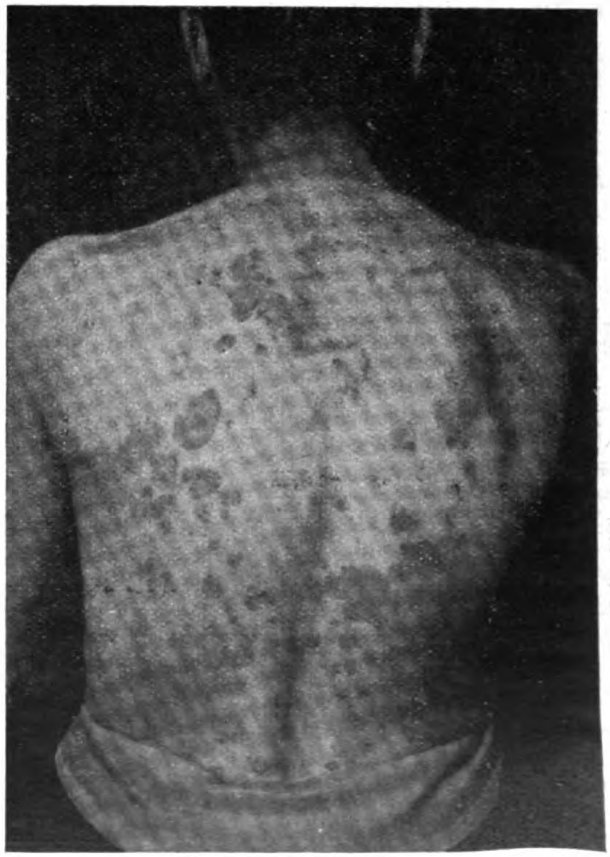
This is perhaps the commonest and most characteristic form of seborrhœic dermatitis. It occurs on the central parts of the chest and back, as an eruption of pin-head-sized, red, generally scale-topped papules, which have the appearance of being, but which actually are not, around the mouths of the pilo-sebaceous follicles. These papules are grouped into little circles or into disc-like patches, and by the extension and multiplication of such circles and patches irregular gyrate patterns may be formed. There may be only a few broken circles or patches on the central part of the chest and back, or these or larger gyrate areas may extend widely over the chest and back (Figs. 3 and 4). Persons who have this eruption always have more or less "seborrhœa capitis," and it is nearly always found that they wear a woollen or flannel garment next the skin which they do not change at night, thus probably allowing ingemination and incubation of micro-organisms which are contained in the scales which drop from the scalp.

This eruption must be distinguished from ringworm of the body (tinea circinata), from pityriasis versicolor and from pityriasis rosea. Its most characteristic features are its distribution, that it is made up of small, yellowish-red papules grouped in circles or patches, and its association with seborrhœa capitis and the wearing of flannel.

(3) *Seborrhœic Dermatitis of the Face and Flexures.*

Sometimes in persons with "seborrhœa capitis" the affection extends a little way on to the forehead in the form of a red, scaly, sharply-margined band just beyond the hairy scalp. It may extend, too, in a similar manner behind the ears. It may involve the eyebrows and the moustache and beard regions in the same way as the scalp, and occur as yellowish-red, scaly patches in the naso-labial furrows. In other cases the axillæ and groins and often the umbilicus may be the seat of similar patches. They here form discs or large, sharply-margined, yellowish-red, slightly scaly patches, sometimes infiltrated and with a moist surface.





FIGS. 3 AND 4.—Seborrhœa corporis (Lichen circinatus).

They may occupy part or whole of the axillæ or groin or extend on to the skin beyond. At the margin of such patches there are outlying pin-head-sized yellowish-red papules, which represent probably the elements from which the patches are built up. Sometimes similar patches and papules occur on other parts of the limbs and trunk. Occasionally the extension to other parts becomes rapidly wide-spread or even almost universal (Fig. 5).

An eruption exactly like, and, as we shall see when discussing the pathology, perhaps identical with, flexural seborrhœic dermatitis, with patches on the limbs and trunk and outlying papular lesions, may arise in association with those areas of chronic dermatitis on the legs, such as often accompany varicose veins and varicose ulcers.

FIG. 5.—Seborrhœa corporis showing eruption in groin.

Similar areas of eruption indistinguishable from seborrhœic dermatitis may occur around surgical wounds in which there has been suppuration. The significance of this similarity between wound dermatitis and seborrhœic dermatitis will be referred to again when discussing the pathological side.

(4) *Eczematisation of Seborrhœic Dermatitis.*

The subjects of seborrhœa capitis or seborrhœic dermatitis are apt to have outbursts of extensive eczema-like eruptions. But it is uncertain whether such eruptions are to be regarded as the result of an eczema added to the seborrhœic dermatitis, or whether they are acute manifestations of the seborrhœic dermatitis itself. This "eczematisation" of a seborrhœic dermatitis is particularly liable to occur when the health of the patient is impaired by work or worry or by some illness. Suddenly the seborrhœic scalp becomes the site of an acute inflammation, with weeping post-aural regions, and even over the face and neck, so that the face becomes red and the eyelids swollen. Similarly the flexural patches, if present, may become "eczematised," and form a starting-point for extension of the eczema on to neighbouring parts. Such cases simulate acute dermatitis from local irritants, such as hair-dyes and plant poisons or from poisoning by food or drugs, and can be distinguished only by the known previous presence of seborrhœa capitis or flexural dermatitis.

Pathology of "Seborrhœic Dermatitis."

Clinical evidence points to a parasitic origin for these complaints, and certain micro-organisms are found in the scales and other inflammatory products, although it is not yet definitely determined whether any of these micro-organisms are the cause of the dermatitis.

The micro-organisms found in these complaints are

(1) The bottle bacillus or spores of Malassez.

(2) A staphylococcus giving a grey culture (Sabouraud), and probably identical with the micrococcus of Unna.

(3) The microbacillus of acne.

The bottle bacillus is found only among the superficial scales, and in the dry form of pityriasis capitis it appears to be the only micro-organism present. In the greasy or pasty form of pityriasis —pityriasis steatoides or seborrhœa capitis and in seborrhœic dermatitis—the two other micro-organisms are found: the staphylococcus in the little collections of serum and pus which are present in the epidermis and the acne bacillus in the mouths of the pilo-sebaceous follicles. The staphylococcus is constantly present, but the acne bacillus is not always seen.

It is thought that the bottle bacillus may be responsible for the scaling in pityriasis capitis, and that the staphylococcus gives rise to the more inflammatory processes of the seborrhœic dermatitis. The part played by the acne bacillus and the cause of the greasy appearance of the scales in the so-called seborrhœic dermatitis is differently interpreted. Sabouraud believes that the apparent greasiness is really due to softening of the scales by serous exudation. Others suppose that the oily seborrhœa, which appears as the result of activity of the sebaceous glands at puberty, forms a suitable soil both for the growth of the acne bacillus and of the staphylococcus, and at the same time renders the scales more greasy.

In favour of the view that the staphylococcus is solely responsible for "seborrhœic dermatitis" is the fact that such eruptions may occur in infancy or childhood, when the acne bacillus, which does not appear until puberty, is absent. And if this be so, the pityriasis due to bottle bacillus and greasy skin associated with the presence of the acne bacillus must be regarded merely as coincidences and due to the fact that these three micro-organisms favour the same regions.

The occurrence of eruptions, indistinguishable from seborrhœic dermatitis, in association with chronic ulcers and suppurating stitch wounds further suggests the staphylococcic origin of these affections.

The histological appearances of seborrhœic dermatitis are those of inflammation involving the epidermis and upper parts of the corium.

(1) Swelling and separation of the cells of the prickle-cell layer of the epidermis (œdema of the prickle-cell layer with some proliferation of these cells—acanthosis), the result of inflammatory reaction with serious exudation.

(2) Proliferation of the cells of the horny layer with imperfect cornification (parakeratosis) as a result of the œdema, and responsible for the scaling which is clinically observed.

(3) Minute collections of serum and small collections of leucocytes in the upper parts of the epidermis (*i.e.* intradermic vesication and microscopic abscess formation).

(4) Cell-exudation around the vessels in the corium.

That these appearances closely resemble on the one hand the histological appearances of eczema and on the other those of psoriasis ought not to be used, as it sometimes is, as an argument for regarding these affections as allied, since the inflammatory reactions of eczema and of psoriasis are probably the result of some non-microbic agent, while these of "seborrhœic dermatitis" are almost certainly microbic in origin, and micro-organisms (absent in eczema and psoriasis) are readily demonstrable in seborrhœic dermatitis.

Treatment of Seborrhœic Dermatitis.

The results of the treatment of seborrhœic dermatitis are usually very satisfactory, so far as the present eruption is concerned, but such eruptions are liable to recur unless frequent attention be paid to the "seborrhœa capitis" which is the starting-point in so many cases. For the treatment of seborrhœa capitis and to prevent recurrences of the eruption elsewhere the scalp should be washed frequently with Hebra's spirit soap (saponis mollis ʒiv, sp. vini rect. ʒij) and warm water, and persons with seborrhœa capitis should shampoo the scalp with this soap generally about once a week. In cases of seborrhœic dermatitis, where the eruption has become eczematised, it is necessary first of all to treat the eruptions as eczemas, by application of a zinc cream, or ointment, or paste, and to add a little sulphur as the acute inflammation subsides. Extensive cases are generally benefited by warm baths before the application of the ointment.

Eruptions sometimes Mistaken for or Confused with Seborrhœic Dermatitis.

Several eruptions are liable to be confused with seborrhœic dermatitis. Of these the chief are:

psoriasis, particularly when it affects the flexures; chronic impetigo involving the scalp and other hairy regions, the post-aural areas and the flexures; a scaly eruption which often attacks the face in children, viz. pityriasis simplex; an eruption on the trunk called pityriasis rosea; and any form of subacute eczema in which scaliness is more prominent than weeping or crusting.

Flexural psoriasis.—For some writers psoriasis is merely a dry form of seborrhœic dermatitis. But in spite of certain clinical and histological resemblances, the fact that no micro-organisms can be found in psoriasis, while they are abundant in seborrhœic dermatitis, should serve as a sharp distinction between these complaints. Moreover, the primary lesion in seborrhœic dermatitis is a small, scaly papule, and the larger areas are made up of a conglomeration of such papules, while the earliest lesion of psoriasis is a scaly macule which spreads peripherally to form larger patches. And again, while seborrhœic dermatitis is easily cured by mild local antiseptics, particularly by sulphur applications, these have no effect upon psoriasis.

But even for those who clearly distinguish these two complaints, flexural psoriasis may be confused with seborrhœic dermatitis unless close attention be paid, for psoriasis, instead of involving the elbows and knees and other extensor areas, may be confined to the groins and the groove between the buttocks, the umbilicus and the axillæ, together with the scalp. But this flexural psoriasis can be distinguished from flexural seborrhœic dermatitis, which it imitates, by the drier and more silvery character of the scales, by the sharper margin of the patches without any outlying papules, and by the fact that it does not yield to treatment by sulphur ointments. Sometimes a pitting of the nails or a patch of psoriasis on the elbow or knee will give the clue to the correct diagnosis.

Chronic impetigo of the scalp and other parts may also simulate a seborrhœic dermatitis. In neglected cases of impetigo capitis the eruption may spread to the whole scalp, and, after a time, become more scaly than crusted. It may then involve the eyebrows, eyelashes, beard, axillæ and groins, and sometimes the post-aural areas, so that it is with difficulty distinguished from seborrhœic dermatitis. The main distinction is that in chronic impetigo a close inspection reveals the presence of small perifollicular pustules, for this complaint is really a staphylococcal sycosis. These chronic impetigoes are also very difficult to cure.

Pityriasis simplex commonly occurs on the face in children as dry, scaly patches about the nose, mouth and ears. It probably includes two affections of different origin: one due to irritation from strong soaps; the other a chronic streptococcal impetigo associated with streptococcal fissures at the side of the nose, angle of the mouth, or at the junction of the ear with the scalp or neck.

Pityriasis rosea is an important but not sufficiently well-known eruption, characterised by a sudden outburst on the trunk and immediately adjacent parts of the limbs (the "vest-area" distribution) of numerous oval or rounded, red patches, which desquamate from the centre outwards. It is thought to be due to some general infection and not to a local cause. It is most often mistaken for a secondary syphilide, but sometimes for ringworm of the body, acute psoriasis, or for a seborrhœic dermatitis.

Chronic eczema.—In any form of patchy eczema or dermatitis from a local irritant, such as sulphur, the eruption may simulate the scaly patches of seborrhœic dermatitis, but the non-association with seborrhœa capitis or corporis or with flexural seborrhœic dermatitis should help towards a correct diagnosis.

The chief practical importance of distinguishing seborrhœic dermatitis from these other eruptions which may simulate it is that seborrhœic dermatitis is readily cured by mild sulphur applications, while the other eruptions are either not influenced or possibly made worse.

Abscess of the Abdominal Wall with Discharge of Ascarides.—T. Fiori records a case in a girl, æt. 14 years, in which the abscess was situated about 6 cm. to the right of the umbilicus and about 1 cm. above a horizontal line passing through the umbilicus, in a region corresponding to the small intestine. The abscess opened spontaneously, and in the course of 7 months 23 worms were evacuated. The condition originated in an intestinal perforation, which had given rise to adhesive inflammation whereby the visceral layer became adherent to the parietal peritoneum.—*Brit. Journ. of Children's Diseases*, p. 286.

ROTATION OF THE LIVER ON ITS VERTICAL AXIS.

By JOHN HOWELL, M.B., F.R.C.S.,

Hon. Surgeon, Cheltenham General Hospital; Consulting Surgeon, Cheltenham Auxiliary Hospital.

On June 23rd, 1916, whilst operating for gall-stones at the General Hospital, Cheltenham, on a woman, æt. 33 years, I came across an extreme degree of rotation of the liver on its vertical axis, which I recorded in the 'British Medical Journal,' February 17th, 1917. On March 27th, 1917, I had the exceptional experience at the same hospital of again meeting it, in a degree only slightly less marked, whilst exploring the abdomen of a discharged soldier preliminary to gastro-enterostomy for duodenal ulcer. The patient was a man, æt. 43 years, a regular soldier, the other was a female, and in Prof. Keith's note which I append to the description of the case it is stated that such rotation of the liver *is confined to women* over 30 years of age, is an extreme degree of prolapse, and is usually accompanied by evidence of visceroptosis. Hence the second point of interest. This patient was a well-set-up soldier, a sergeant-major-instructor of the R.F.A., and had been in the Regular Army since 1892—the last person, in fact, in whom one would expect to find evidence of visceroptosis—and the examination of the viscera at the operation failed to disclose any more than this "prolapse" of the liver, which had allowed it to rotate to the extent that I shall shortly describe. But is rotation of the liver due to prolapse? When operating on the woman, innocent as I was of any previous experience either clinically or in medical literature, I naturally concluded, guided by my faint recollection of embryology, that the stomach and duodenum in rotating from the middle line from left to right had carried the liver, developed in the ventral mesentery, with them through an angle of 90°. The theory fitted the case so aptly that Prof. Keith's note came as no slight shock to me, but in the face of his overwhelmingly superior knowledge there was nothing for it but unconditional surrender. In the light of my later experience I am tempted to be bold again and ask the question—"Is rotation of the liver on its vertical axis due to prolapse?"

The case was as follows:

E. R—, æt. 43 years, sergeant-major-instructor, R.F.A., regular soldier 1892 to 1917, discharged from the Army on account of duodenal ulcer. In September, 1899, was invalided for 2 months because in an accident his horse rolled heavily over him from "groins to shoulder." In 1900 had a slight attack of dysentery 4 weeks. In April, 1901, he was in hospital with severe pains in the stomach and right side diagnosed as congestion of the liver due to previous dysentery; the symptoms were identical with his present disability and lasted 6 weeks. In April, 1913, he was invalided for 6 weeks with the same symptoms. In July and November, 1915, occasional vomiting accompanied the pains. In January, 1916, he vomited blood, and in March, 1916, was found unfit for general service by a Medical Board. In July, 1916, he was admitted into the Civil Hospital, Luton, suffering from "severe hæmorrhage" from the bowels, vomited about 2 pints of blood by mouth and was absent from duty 3 months. In the latter half of November, 1916, the pain returned "high up under the ribs on the right side," more acute at night, and on December 9th he was admitted to the 1st Eastern General Hospital, Cambridge, for treatment and operation. For weeks he was continually sick, "with blood each time." He asked for an operation but was informed that it was not desirable. On February 2nd he was discharged by a Medical Board as no longer fit for war service, and a few weeks later, on March 8th, 1917, was admitted into the Cheltenham General Hospital under my colleague, Dr. Johns, for observation.

On March 27th Dr. Johns asked me to perform a gastroenterostomy upon him for the cure of a chronic duodenal ulcer. I made an incision to the right of the middle line, and found the omentum, suspensory ligament, pylorus and duodenum fairly firmly matted together. On separating them the suspensory ligament was found to lie across the upper part of the wound, covering up the liver. The upper surface of the right lobe of the liver was firmly adherent to the upper surface of the diaphragm. The ulcer was discovered in the first part of the duodenum on its anterior surface close to the pylorus. To experienced surgeons it may well appear a questionable procedure to break through the protective adhesions surrounding the

ulcerated duodenum, but my first thought on viewing the matted viscera from the middle line to the right semilunar line was that the trouble after all might be due to disease of the gall-bladder, and I would not proceed with the gastroenterostomy until I had satisfied myself as to its condition. That was a great deal easier said than done. It required a careful and laborious dissection of the adhesions and the enlargement of the wound by a horizontal incision through the rectus at right angles to my first. When I had "worked through" it was only to find no reward in the shape of a gall-bladder in the place where I had a right to expect it. A few more minutes' examination were necessary to discover it deep in the right hypochondrium and free from adhesions or other sign of disease, with its fundus opposite the mid-axillary line. And so I had the (surely) unusual experience of two cases of rotation of the liver within a year. In the case of the woman the transverse incision of the rectus and the exposure this entailed of the abdominal viscera caused so much shock that any detailed examination of the anomaly was prohibited, but in this case though I had yet to perform the gastroenterostomy for the ulcer which had been disclosed, the anæsthetist, Dr. Hugh Powell, to whom I am greatly indebted for the success of the operation, felt no uneasiness for his patient at the prospect of the little extra time to be taken up in a rough survey of the relationship of the liver to its surroundings. It may at once be said there was no sign of visceroptosis. The gall-bladder had no mesentery in this case; the right kidney was fixed and in its proper place, the left kidney was also normal, and the various mesenteries seemed of normal size and length, though there was a fair amount of fat in them and in the great omentum. The stomach and intestines were not in the least degree dilated and atonic. The gastro-hepatic omentum had been mixed up in a mass of adhesions which I had previously broken up, and so far from being lengthened, the duodenum and pylorus had been actually adherent to the under surface of the liver. That part of the suspensory ligament of the liver between it and the diaphragm could not be explored because the upper surface of the right liver was strongly adherent to the diaphragm, and there was no necessity to interfere with them. As for the liver itself, though the rotation on its vertical axis had not proceeded to the extent I described in the last case, in which the fundus of the gall-bladder was opposite the *posterior* axillary line, the fundus in this case was opposite the *mid-axillary* line. In the case of the woman the gall-bladder, suspended by a 1-in. mesentery, was an immediate anterior relation of the right kidney; in this case there was the distance of two or three fingers' breadths between the two. The course of the common bile-duct was interesting, and ran from the junction of the cystic and the hepatic ducts downwards and inwards to the outer side of the second part of the duodenum, disappearing behind it just above the junction of its lower and middle thirds, *i. e.* it could be seen and felt in almost the whole of its extent under the peritoneum. In the previous case I had failed to insert a finger in the foramen of Winslow; here it was quite simple to do so, but the anterior pillar felt flatter and less like a "pillar" than it does ordinarily. The notch of the liver was opposite the right semilunar line.

The gastroenterostomy was then performed, and the patient made an excellent recovery.

In the ordinary sense in which one uses the term "prolapse" it may safely be said that the liver in this case was not prolapsed; it was not enlarged, and its right lobe was strongly adherent to the vault of the diaphragm, so that unless the diaphragm was "prolapsed" it necessarily follows that the liver could not be. It may be urged that the liver was suddenly rotated by the accident of the horse rolling over him in September, 1899, before he had had any symptoms of duodenal ulcer —a possibility it is true, but by no means a probability, for unless the ligaments which suspend it were ruptured and the other physical forces which assist them to maintain the liver in its normal position were put out of gear, the elasticity of those ligaments and the re-establishment of those other physical forces would bring the liver back to its original position. I am not sure but that the protection of the ribs would be sufficient to prevent such an accident; in any case there is the additional obstacle to be got over of the course of the common bile-duct. I cannot imagine any accident which would dislocate this from behind the first and second part of the duodenum to a position outside these and immediately underneath the peritoneum. However, I do not feel myself

in a position to argue the point; the literature available is meagre, and not satisfying to anyone seeking information as to the cause of this abnormality. Certain it is that the impression which this case leaves on my mind is that rotation of the liver on its vertical axis may be congenital in some cases at all events.

A copy of this article was sent to Prof. Keith, and appended are the notes with which he very kindly favoured me:

"DEAR MR. HOWELL,

"We are a little bit at cross-purposes owing to the different uses we are making of the word 'rotation.' When your article appeared in the 'British Medical Journal,' February 17th, I saw that I had misunderstood you; the rotation which I was speaking of is the only true rotation I know of, and that is a rotation which leads to the diaphragmatic surface becoming almost entirely anterior, and which is nearly always seen only in women, and has never been seen (so far as I can learn) in anyone under the age of 20. The condition is, I think, always associated with enteroptosis. When I re-read your account I realised it was not this rotation round what one may call a horizontal axis, but round what you call a vertical axis—a rotation as of a door on its hinge, the hinge of the liver being represented by the pericaval or retrohepatic ligament—meso-hepar as I once proposed to call it.

"Now the rotation—or, as I would call it, the displacement—you describe, commoner in women than in men, but by no means rare in both sexes in the dissecting room, takes place every time we take a meal and every time we take a breath to a slight degree. Why it is that in a very considerable number of people an extensive displacement occurs, one which leads to the greater part of the cystic area of the right lobe occupying a lateral and almost right lumbar site, is a matter which not any of us have inquired into very much, but I shall be surprised if the diaphragm of your male patient occupies a normal level: I think you will find that for some cause or another the liver has been extruded from the subdiaphragmatic space. Why I think the matter is important is this: Whenever we find a condition we do not understand we are too apt to fly to the home of the mentally destitute—congenitalism. Before you or I have any right to say a thing is congenital we have to show that it does exist as a condition in the newly-born. Now, not only is such a condition never seen or recorded—(I have examined about 200 newly-born children)—but it does not resemble any developmental stage, but does represent such a state as we might expect under the conditions which keep the abdominal viscera in their place.

"A. KEITH."

Recurrent Ectopic Gestation on the Same Side.—Guildal reports the case of a multipara, æt. 35 years, who was admitted to hospital. She had been well till her first confinement at 26. Since then she had suffered from intermittent pain in both iliac fossæ, a vaginal discharge and occasional bouts of fever. At 28 she again had a normal labour. At 30 she was operated on for rupture of an ectopic gestation. The left uterine appendages were found converted into a swelling of the size of a hen's egg. Clamps were applied close to the left side of the uterus and the abdominal ostium, and the pregnant tube excised. It was full of clots, and it had ruptured at a point where the tube formed a diverticulum of the size of a nut. The abdominal ostium was completely sealed. The left ovary and the right uterine appendages, which were healthy, were not removed. At 32 she had a normal uterine pregnancy and labour.

On admission she presented the typical signs of a ruptured extra-uterine gestation. She was very pale and collapsed, and the pulse of 140 was soft and small. The temperature was normal. Owing to great abdominal tenderness and rigidity examination yielded little information. Under ether a median abdominal incision was made close to the scar of the former operation. Much clotted and fluid blood was found in the peritoneal cavity. The right uterine appendages were at once sought, but apart from some small cysts of the ovary they were perfectly normal. The uterus, too, was normal except at its left upper pole, on which there was a red, bleeding swelling, of the size of a cherry, which appeared to have a chorionic covering. The swelling was excised and the wound of the excision was closed with catgut sutures. No ovary was detected on the left side, and the only trace of the previous operation was a slender band passing from the sigmoid flexure to the left side of the uterus. This band was ligatured and divided, and the abdomen was closed. Recovery was uneventful. Microscopic examination of the excised swelling revealed uterine tissues, including muscle and chorionic villi.—*Ugeskrift for Laeger*, p. 1525.

THE TREATMENT OF SIMPLE AND COMPOUND FRACTURES OF THE NOSE.

By RUSHTON PARKER, M.B., B.S., F.R.C.S.,
Professor of Surgery in the University of Liverpool,
Lt.-Col., R.A.M.C.T., Mersey Defences.

(1) A YOUNG man, æt. 21 years, was brought to me in private on the evening of October 27th, 1894, an hour or two after receiving a blow from a hockey-stick. His nose was cut and bleeding on the bridge, with the nasal bones loose in the wound. The right bone was simply loose, the left broken into three pieces and still more loose. The middle piece, a small fragment bare of periosteum, etc., was removed, while the wound and nasal bridge were covered up in a pad of cyanide gauze, attached by a strip of cotton-net stuck to the skin with collodion He called next morning to have the blood-stained dressing changed for a similar smaller pad. By this time all bleeding had ceased, and a single suture was put in. On the fifth day 2 more sutures were put in, closing the wound altogether. On the seventh day all 3 sutures were removed, and a still smaller dressing fixed on in the same way. On the tenth day he resumed his business and hockey-playing, the skin and bones being soundly healed.

There was never any ecchymosis, as this does not occur with compound fracture, and he was directed to manipulate the bridge of his nose daily to keep it in proper shape.

In 1907, on February 12th, he called upon me and I found his nose almost absolutely symmetrical.

In 1916 I met him on the Liverpool landing-stage, being engaged as a lieutenant of the 5th South Lancs., in charge of alien prisoners between the Isle of Man and London. The scar on his nose was linear and very slight, and the nose absolutely symmetrical. The small gap in the left nasal bone had long been filled up by new growth of bone, as I expected on the first day.

(2) Another young man, æt. 20 years, son of a neighbouring medical colleague, while playing in a football match for a Cambridge College at Tonbridge on February 19th, 1913, had his nose violently struck by the knee of an antagonist, with immediate profuse bleeding from the nostrils, and deformity of the nasal bridge. He finished his match and returned to Cambridge the same day. There he consulted Mr. Arthur Cooke, who next morning replaced the deformed nasal bones under an anæsthetic, the patient coming home the same day to Liverpool, where I saw him that evening. Finding the shape of the nose undeformed I directed him to finger the loose bridge gently every day till the bones settled stiffly into permanent symmetry. Here also there was never any ecchymosis, and he was soon all right—a state which has continued until I last saw him on March 20th, 1919.

It is often the case that injured noses are attended with profuse swelling and ecchymosis in the absence of nose-bleeding. This is the time to feel for looseness of the nasal bones, and to practise daily fingering for the prevention of deformity from mal-union. It is desirable in such cases to feel at once for fracture, and not be merely dismayed at the swelling and ecchymosis. Otherwise, if the medical attendant loses valuable time in "taking down the swelling," as it is called, by the time the swelling is gone the bones, having at first been hidden under it, may become attached in faulty position, and perhaps the diagnosis of fracture only made thus late, on the recognition of deforming mal-union.

In several cases of this kind I have loosened the bones again by a few smart taps of a hammer over a piece of leather or folded paper, under an anæsthetic, and then prescribed the frequent fingering of the nasal bridge until the bones have become re-attached in good position. In adult cases the patient carries on the necessary fingering before the looking-glass. By that means a loose nasal bridge may be made to acquire any shape desired.

(3) In the case of a little girl, æt. 10 years, whose mother was impressed by the hideous shape of the nose, the right side of the bridge being flattened owing to a fall on board ship, my offer to re-fracture the nose was accepted, and carried out the same day in her nursery. The necessary daily manipulation was conducted by the family nurse, symmetry being established at the end of 4 weeks.

This simple and ingenious management of loose fractures of the nasal bones I learnt from Hugh Owen Thomas many years ago. However loose the bones may be under a mass of ecchymosis they quickly become stiffened into an attachment which is more likely to be faulty than not, unless daily "fingered," under which most simple treatment they are trained into position and eventually remain fixed there.

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THE DIFFERENTIAL DIAGNOSIS OF MEDICAL FROM SURGICAL DYSPEPSIAS.*

By ROBERT HUTCHISON, M.D., F.R.C.P.,
Physician to the London Hospital.

LADIES AND GENTLEMEN,—Having determined, by the methods described in my last lecture, that your patient is really suffering from some affection of the stomach and not from some other condition which simulates it, your next task is to decide whether the case is one for surgical or medical treatment.

Now one may say of surgical dyspepsias that they are all organic, although the converse is not true that all organic cases are surgical; and one may further say that the chief symptoms of organic disease of the stomach are three in number, and to these I want to direct your special attention. These symptoms are real *pain*, as distinguished from discomfort, frequent *vomiting*, and *wasting*. If your patient has one or other of these symptoms, or, still more, all of them, you may feel reasonably confident that you are dealing with a case of organic disease, and in the majority of such cases the condition will be one for surgical treatment. At all events, this statement you may make without any reservation: that if these symptoms, or one of them, be not present, it will be very unwise to operate. I would say, moreover, because it will save you a lot of trouble, that if any or all of those symptoms are present, you do not need to bother very much about carrying your diagnosis further unless it be to gratify your intellectual

* One of a course of post-graduate lectures held at the London Hospital.

curiosity. It is very nice to be able to say exactly what you will find when you open the abdomen, but it really does not matter very much to the patient. The surgeon can tell in two minutes, once he has made his incision, what it is that is wrong. You will hear a great deal later on in this course—not from me, but from others more competent to speak on the matter—as to the differential diagnosis between appendix dyspepsia, ulcer, gall-stones, and so forth. I admit it is interesting to make those diagnoses just as it is interesting to do picture-puzzles or acrostics, but it does not help your patient much, because if the symptoms I have mentioned are present, then operation is called for in any case.

There are, however, a few *medical* conditions which, by producing real pain or vomiting, may simulate surgical dyspepsia. They are not numerous, because the vast bulk of medical dyspepsias—namely, functional disorders of the stomach—are excluded right away by the fact that they do not produce these symptoms; but there are a few organic affections not suitable for operation which may give rise to difficulty.

Gastralgia.

The first of these is the condition which I shall speak of under the title of "gastralgia." I admit the name is an unfortunate one because it suggests a mere functional disorder—a painful or hypersensitive condition of the stomach. I want you therefore to realise clearly what I mean by gastralgia. I mean by it that form of dyspepsia which is characteristically met with in young women, especially in young unmarried women. It is probably not in the strict sense of the term a functional condition; there is no doubt an organic change in the mucous membrane, which if looked at would, I believe, be found to be congested and often the seat of erosions or even small acute ulcers. Owing to the tendency of these erosions and ulcers to bleed hæmatemesis often occurs, and hence it is a condition which simulates chronic gastric ulcer rather closely. Indeed, at the time I was a student these cases were always spoken of as gastric ulcer, and when you read statements that gastric ulcer is much commoner in women than in men, you may know at once that the person who so writes has not learned to distinguish gastralgia from chronic gastric ulcer, because all accurate observation made on the operating table shows that chronic gastric ulcer is, if anything, commoner in men than it is in women, whereas this form of disease—call it functional or organic, as you please—is not only commoner in women, but it is exclusively met with in women. I do not think I have ever seen a case of it in a man. Other names have been applied to it. It has been called, for instance, by Sir William Hale-White, "gastrostaxis" because of the tendency to bleed—not a very happy term, because a tendency to bleed is only one of its features, and an inconstant one at that. The majority do not bleed or they bleed only late. It has also been called by Sir Bertrand Dawson "hæmorrhagic gastralgia," which means it is a gastralgia with a tendency for bleeding to take place. I think it might be more accurately termed "acute ulcer," because I think that in the majority of these cases there *is* an ulcer, if you understand by ulcer any lesion of the mucous membrane, however small. But it does not matter what you call it as long as you are able to recognise the condition when you meet it.

What, then, are the clinical features of this condition? I mentioned a moment ago the most important of all of them from the diagnostic point of view, namely, that it is a disease characteristic of the young unmarried woman. The symptoms are these: Pain—and observe it is *real* pain, not the mere discomfort complained of in functional dyspepsia—which comes on almost immediately after a meal. In this it differs from the pain of true gastric ulcer, which comes on about two hours after a meal. The pain is situated in the epigastrium, and it often goes through to the back. It is brought on almost as much by liquids as by solids—in this again differing from true ulcer, for in the latter solid food causes more pain than slops and milk. The pain is frequently accompanied by vomiting, which relieves the pain just as it does in chronic ulcer. There may, as I have said, be profuse hæmatemesis.

Gastralgia, as I have defined it, is not a disease for surgical treatment. I have seen cases in which gastro-enterostomy had been performed, and so far from the patients being relieved, they were rather worse after the operation than before. Not even when they bleed is operation called

for, because fortunately the hæmatemesis of this disease is very rarely fatal—differing in that respect from the hæmatemesis of chronic gastric ulcer, which is often fatal. Furthermore, if one does operate for the hæmatemesis, one finds that the blood comes from tiny ulcers or erosions which cannot be satisfactorily dealt with; there is not a single bleeding point, as in chronic gastric ulcer.

In the majority of cases you will have no difficulty in diagnosing gastralgia in young women, but there is a group of cases which may perplex you. I refer to those which occur at that age which is so common in women—an age which they reach so slowly and at which they linger so long—35 or thereabouts. You will have difficulty when women of that period of life, especially if they be unmarried, come to you with these symptoms, because they are then getting to the true ulcer age. In some such cases—indeed in several—one has been obliged to say that exploration was the only way to settle the diagnosis, because you cannot with certainty diagnose ulcer of the stomach by X-ray examination, and the test-meal findings are very much the same in gastralgia as in true chronic ulcer, namely, a tendency to hyperacidity. You need never hesitate to advise exploration if you have confidence that the surgeon to whom you entrust the operation has got the moral courage to close the abdomen if he finds no visible lesion in the stomach. If that were always done there would be fewer disappointments after gastro-enterostomy than there are.

Hyperchlorhydria.

The second condition, which may simulate a surgical dyspepsia, is that which goes by the name—again a name I do not like—of hyperchlorhydria. That means, of course, excess of acid in the gastric juice, and its symptom is "hunger-pain"—pain when the stomach is empty, or when it is getting empty. But you may say, as some have done, "Oh, all cases of hunger-pain are duodenal ulcer." Of course, if you are going to say that, there is nothing more to be said. But I am certain of this—that there is a medical hunger-pain as well as a surgical hunger-pain. I know that, because several times I have had the abdomen opened in the case of patients who have had hunger-pain and who had the test-meal findings of hyperchlorhydria, and yet no gross lesion of the duodenum could be demonstrated. I am not prepared to deny that hyperchlorhydria may be associated with some change in the mucous membrane of the duodenum: I think it probably is, and that it is not a purely functional condition. If you could carefully inspect the mucous membrane in such a case I think it probable you would find changes in it, perhaps comparable with the changes in the stomach in gastralgia, but certainly there are cases of hyperchlorhydria with hunger-pain which do not show any gross duodenal ulceration.

You may say, again, as others have said, "These are cases of appendix dyspepsia." You know how surgeons are down on the appendix. I do not know why. They do not adopt the same attitude to other abdominal organs. The gall-bladder, for instance, has got to be convicted of some gross crime, such as that of harbouring stones, or foreign microbes, before even the most bloody-minded surgeon will inflict upon it the capital punishment of excision. But the least deviation from the straight path on the part of the appendix results in it being accused of being "kinked," or if, on being exposed at the operation, it is found to exhibit the least blush, it is accused of being "inflamed"; and not only accused of being diseased in itself, but of being the cause of any disturbance which may be going on anywhere in the abdomen. Then the sentence goes forth—"Off with his head!" If, then, you are determined to make out, as some people are, that there is no such thing as a medical hyperchlorhydria, and that the clinical condition which goes by that name is either duodenal ulcer or appendix dyspepsia, you can always make out a case for your view, for it is one of the rarest things to see a surgeon pull out an appendix on the operating-table and admit it to be perfectly normal: it is so rare that I can scarcely recall such an incident. I repeat, however, that in my opinion there is a functional condition which simulates duodenal ulcer, just as gastralgia simulates gastric ulcer; and just as gastralgia is the characteristic dyspepsia of young women, so hyperchlorhydria is the characteristic dyspepsia of young men. I told you that I have never seen "gastralgia" in a man, and I have hardly ever seen "hyperchlorhydria" in a woman. Again, just as the age when a woman is verging on middle life is that at which one has difficulty in differentiating gastralgia from true chronic ulcer, so in men the same period is that

at which one has a difficulty in distinguishing between hyperchlorhydria and true duodenal ulcer. In both cases exploration may be the only means of settling the matter, but the older the patient and the longer the symptoms have lasted, the more likely it is that true ulcer is present. If mælena has occurred you may be sure that there is a duodenal ulcer, because "hyperchlorhydria" does not tend to bleed as gastralgia does.

Gastritis.

The third form of medical dyspepsia I have to mention which may simulate surgical disease is gastritis. And here we are in no doubt about our terminology, for "gastritis" actually describes the condition; it is an inflammation of the mucous membrane of the stomach, and the surgical condition from which you have to differentiate it is early carcinoma.

The first point I would make about gastritis is that it is a comparatively rare condition. Get that firmly fixed in your minds, please, because apparently it is not the prevailing view amongst practitioners. There is no more favourite diagnosis than "chronic gastritis," or "chronic gastric catarrh," and there is no diagnosis which is more often wrong. Gastritis is also one of the few conditions which can be diagnosed with certainty by the stomach-tube alone, because its sole characteristic feature is the presence in the test-meal of an excess of mucus.

You will meet gastritis in two forms. First, *secondary gastritis*, in which the catarrh of the stomach is consecutive to disease elsewhere. It is due usually to chronic congestion of the stomach, and you meet with it in chronic valvular disease of the heart and cirrhosis of the liver. You meet with a chronic toxæmic gastritis in renal disease, and in some cases of pulmonary tuberculosis. In cases of this sort the disease of the heart, kidney or lung so dominates the clinical picture that the gastritis is a secondary matter, and the question is not likely to arise as to whether it is a medical or a surgical condition.

But the case is otherwise when you are dealing with a *primary gastritis*, which may result from a chronic irritation of the stomach either through imperfectly chewed or coarse food, or food which contains a chemical irritant (highly-spiced articles, for instance), or which is either too hot or too cold. The most familiar form is alcoholic gastritis, the form which results from taking too much alcohol, especially the drinking of neat spirits on an empty stomach. Such cases exhibit, in an aggravated form, the symptoms of gastritis, loss of appetite, nausea, and occasional retching or vomiting, with discomfort, but not actual pain. But these symptoms are, as you know, very much the symptoms of early carcinoma in that stage in which it is still amenable to operation, *i.e.* in which there is a reasonable chance of curing the patient by partial gastrectomy.. How, then, will you diagnose between chronic gastritis and early carcinoma? A test-meal will not help you much, because in both there is diminished hydrochloric acid, but an excess of mucus points to gastritis. How about X rays? You ought to use the X rays in these cases, although I wish I were able to say I had complete confidence in them, but I have been let down by the radiographer in cases of early carcinoma too often for that. By all means be guided by the X-ray picture when the result is positive, but if it is negative do not conclude that carcinoma is excluded.

There is another symptom which is of use in the differentiation. I told you that the three signs of surgical organic disease are pain, vomiting, and *wasting*, but patients with gastritis do not waste, or only slightly; in that they resemble cases of functional indigestion. On the other hand, carcinoma patients do waste, and it is a symptom to which you should attach considerable importance in determining whether a case is one for the physician or whether it is one for the surgeon. If a patient beyond the age of 40 presents the symptoms I have described, the test-meal shows diminished acidity with absence of free HCl, and the X-ray report is doubtful, and if, in addition, he has lost considerable weight in the last few weeks and has felt weak, you should be strongly suspicious of malignant disease. Further than that in quite a number of cases you cannot go, for I do not think it is possible to diagnose gastric carcinoma in its early, operable stages with certainty by any known method. So here again you must frequently have recourse to exploration. If medical treatment—putting the teeth right, regulating the diet, ordering bismuth, or a bismuth and rhubarb mixture, and sending the patient away for a change—does not result in a definite improvement in a

few weeks, you must insist upon exploration. The tendency, not merely on the part of the patient but often on the part of the doctor, is to put it off too long. I know it requires some moral courage to insist upon an exploratory operation, and the difficulty is made all the greater by a good-natured but weak-minded effort to keep the truth from the patient and to avoid mentioning the word "carcinoma," still more "cancer." Hence it becomes difficult to put the case sufficiently clearly before the patient for him to decide—as probably he would decide—in favour of exploration. One does not say straight out to him, "You have either got cancer or catarrh of the stomach, and if it is cancer your only chance is immediate operation." Instead of that one talks vaguely about "serious disease" or "ulceration," or "thickening of the wall of the stomach." One camouflages the situation by half-truths, or a total falsehood, with the result that the patient never has a clear issue before him so that he can decide, yes or no, before it is too late. As it is we go muddling along, concealing the truth from him until a lump appears in the epigastrium, and then it is usually too late to do anything.

Atonic Dilatation.

I come now to a condition which is half-way between functional and organic, namely, gastroptosis and atonic dilatation. I shall say nothing about gastroptosis, because that will be dealt with in another lecture in this course; but I want to say something to you about atonic dilatation.

The condition from which atonic dilatation has to be diagnosed is organic dilatation, and the diagnosis is a matter of supreme importance, for this reason: whereas organic dilatation is the ideal case for gastro-enterostomy—and by organic dilatation I mean a condition of obstruction due to benign stricture—that operation in atonic dilatation is an absolutely hopeless procedure and is foredoomed to failure: indeed, it not only does no good, but leaves the patient much worse than before. I have several times been obliged to recommend that a gastro-enterostomy which had been done at some risk (and expense) should be undone and the parts restored to their normal condition. In every case where I have had to recommend that, it was found that there was no sign of organic disease, but that the operation had been performed on an atonically dilated stomach. Seeing, then, that one group of cases are those in which the operation of gastro-enterostomy gives us the most brilliant results, whereas in the other it ends disastrously, you will see how important it is to determine whether you are here dealing with a medical or with a surgical dyspepsia.

The sign which atonic or primary dilatation and secondary or organic dilatation have in common is enlargement of the stomach beyond its normal limits, with the presence, on succussion, of a splash. The characteristic sign of organic dilatation is *visible peristalsis*—waves of contraction which can be seen coursing over the stomach from left to right. One never meets with that in atonic dilatation. I think that is a statement which can be made without any reservation whatever: if you see these peristaltic waves, you are dealing with obstruction of the pylorus. If I did make any reservation, it would be that there are some cases of *gastroptosis* associated with slight atonic dilatation (and the two conditions often go together), in which visible peristalsis is seen. But even in these cases I think it is highly probable that one is dealing with an obstruction produced by a kinking of the duodenum, for in pronounced cases of gastroptosis, where the stomach has dropped down very much, there may be enough kinking of the duodenum to produce some obstruction. If you except such cases—and they are really organic—I say, without hesitation, that waves of visible peristalsis point to obstruction, *i. e.* to a surgical condition. Take, next, the result of a test-meal. In organic dilatation there is true stagnation of the food—that is, after a test *dinner*, you will find residues of the meal still in the stomach 24 or even 48 hours afterwards. In primary dilatation I think the stomach always empties itself in 12 hours.

Again, X rays may help. They may reveal the waves of peristalsis rushing up to the pylorus, showing that it is obstructed, and that the bismuth meal is not forced through as it should be. Apart from these methods the symptoms will help you, because the great symptom of organic dilatation is copious periodic vomiting, and especially nocturnal vomiting, the patient bringing up an enormous quantity of fluid, of the characteristic fermenting, yeasty sort. Often the patient will tell you that he vomits far more than he has swallowed during the day. Patients with chronic atonic dilatation do

not do that: as a rule they do not vomit at all, the symptoms rather running in the direction of flatulence and a feeling of weight and discomfort.

These, then, ladies and gentlemen, are the conditions of a medical sort which you have to distinguish from the corresponding surgical ones, and I would only end as I began, by saying—and I would repeat it *ad nauseam* if necessary, I shall go on repeating it until it has effected a lodgment in your cerebral cells—that *real pain, vomiting and wasting are the cardinal features of organic, and particularly of surgical, dyspepsia*, and that if none of those be present, you may be almost certain the case is not one for the surgeon. If, on the other hand, one or more of them is present, it is a surgical case provided you have excluded the conditions I have described. But there will be a residuum of cases in which you will be unable to make the diagnosis with certainty, and in those it is your duty to give the patient the benefit of the doubt and advise exploration, which, remember, is not surgical treatment, but a method of diagnosis. You may have to advise that course particularly in doubtful cases of gastralgia which simulate gastric ulcer, in doubtful cases of hyperchlorhydria which simulate duodenal ulcer, and in doubtful cases of gastritis which simulate early carcinoma, as well as in some cases of atonic dilatation which simulate organic dilatation. If the surgeon, when opening the abdomen, is clear in his mind that what he is doing is really only a sort of super-test-meal, or a kind of glorified X-ray investigation, and not a method of treatment, there is no harm done. If he finds organic disease, he deals with it: if he does not he should at once stitch the patient up and send him or her back to the physician.

Eyelash in the Punctum Lacrymale.—Lieut. Haigh reports the case of a man awakened by soreness in the right eye. His wife clipped off what she assumed to be an inverted eyelash scratching the eyeball. He was not relieved. Several medical officers who examined him observed hyperæmia of the ocular conjunctiva near the inner canthus, but did not discover the cause. Several hours later a black speck was discovered in the orifice of the inferior canaliculus, which, when magnified by a lens, appeared to be the stump of a displaced eyelash. With the aid of the lens it was grasped with forceps and drawn out of the canaliculus. It was a fragment of an eyelash, $\frac{3}{8}$ in. long. Relief was immediate.—*Journ. Amer. Med. Assoc.*, p. 275.

TWO CASES OF INTUSSUSCEPTION OF THE CYSTIC APPENDIX.

By ALEX. MACLENNAN, M.B., C.M.,

Honorary Visiting Surgeon, Royal Hospital for Sick Children, Glasgow; Honorary Consulting Surgeon, Royal Infirmary, Stirling; Consulting Surgeon, County Council of Lanarkshire; Consulting Surgeon in Glasgow to the East Coast Railways.

THESE reports of two cases of intussusception of the cystic appendix are of interest, especially from the clinical standpoint, because they resemble each other sufficiently in their symptoms and signs to constitute a definite picture peculiar to this condition. Neither case was diagnosed before operation, though in the second case the possibility of such being present was taken into consideration. The object of publishing these two cases—instances of a somewhat rare condition—is to bring into prominence the fact that the cystic appendix, when it becomes invaginated more or less into the cæcum, gives rise to a syndrome which is definite. The condition does not simulate an appendicitis in any special degree, and the two should be capable of differentiation. The production of a cystic appendix is, in all probability, due to an attack of appendicitis of some sort. A vicious circle will become established, for a narrowing or stricture of the lumen of the appendix is a very common cause of acute appendicitis. Few appendices, however, become sealed off just at their proximal end and survive considerable distension without showing signs of inflammation and without having infective contents.

It is outside the scope of this paper to discuss the influence of appendicitis on the origin of intussusception. In my opinion intussusception arises from a thickening of part of the cæcal wall, usually near the proximal end of the appendix, but not necessarily having any relationship with it. If the submucous layer of the bowel becomes thickened, of necessity the whole wall of the bowel must become buckled inwards, and once this initial condition is established subsequent invagination is readily understood. In the many cases of intussusception admitted to the Royal Hospital for Sick Children and operated on by me, enlarged mesen-

teric glands in the ileo-cæcal junction have been invariably observed, these being an indication of the infection of ileo-cæcal bowel. In one case of very chronic recurring attacks of pain situated in the right iliac region of a child, just this very condition of buckling inwards of a thickened patch in the cæcal wall was found at operation; its reduction was immediately followed by its recurrence. An ordinary intussusception had only been prevented by the absence of mobility of the cæcum. In the cases now reported, adhesions, especially of the appendix to the ileum, had prevented the initial stage of an acute intussusception from developing into the ordinary ileo-cæcal type.

CASE 1: *History.*—Mrs. W— came under observation in 1909. Twelve years previously she had an ovarian tumour removed. Convalescence was complicated by jaundice. For some years the patient had complained of pain in the back and in the right side, especially if she turned on her side suddenly. Constipation was present, but was corrected by drugs. It was not possible to state that a definite appendicitis had been present.

Examination.—The abdomen was neither distended nor rigid. A swelling was readily palpable in the right iliac fossa about the size of an egg. It formed a rounded, hard, slightly tender mass, freely moveable within a limited range in all directions except upwards. Vaginal examination revealed the presence of an ovarian tumour on the left side. The former ovariotomy was represented by a small nodule, which closely approached the swelling in the right iliac fossa. There was nothing further made out, and the abdominal mass was considered to be either a new growth or an inflammatory infiltration associated with the former ovariotomy.

Operation.—The old abdominal scar was excised and the abdomen opened. A dermoid of the left ovary was removed. The right iliac swelling was found to consist of the cæcum, appendix, and the last few inches of the ileum all matted together by light adhesions. It was considered to be a new growth of the appendix, and the ileo-cæcal junction was removed. Fig. 1 shows the specimen with the cæcum laid open.

Twenty-two days later the patient had a sudden pleurisy due to pulmonary embolism. The abdominal condition was then perfect, and a week later she had arranged to leave the nursing

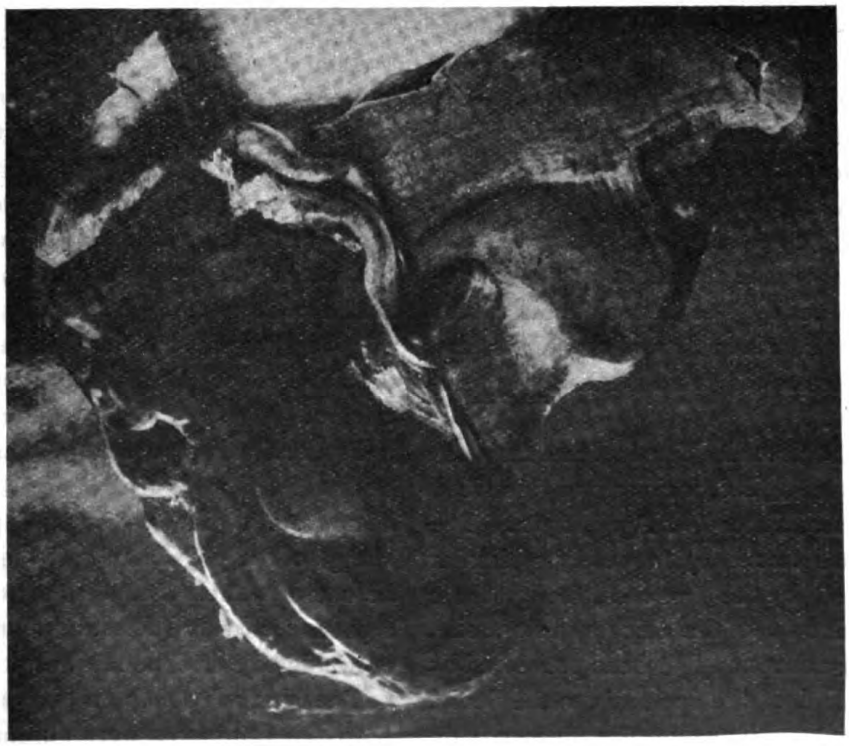

FIG. 1.—Cæcum laid open, showing the cystic appendix projecting into it; the patent ileo-cæcal valve valve is shown lying to the left.

home when an overwhelming pulmonary embolism occurred, and in 20 minutes she was dead.

CASE 2.—Lieut. W— was admitted to Yorkhill War Hospital from France with the diagnosis of neurasthenia. I was asked to see him by the physician in charge on account of an abdominal tumour and pain.

The history.—In 1909 he suffered from sunstroke in India. In 1916 he had an attack of severe colic, with pain in the right testicle and vomiting. The attack did not last long : it might have been due to appendix mischief or have been associated with the kidney. Since this he found that after standing for any length of time pain developed in the right iliac region ; it was relieved by pressure and by support of the lower abdomen by the hand. In July, 1918, while being massaged by his native servant on account of the pain a fixed lump was discovered : the massage freed it, and since then the tumour has been very mobile. He also complained of urinary irritation, pain in his back, defective vision, and general weakness.

Examination.—A swelling about the size of an egg could be manipulated into the right iliac fossa from somewhere in the neighbourhood. It was firm, smooth, rounded, and only slightly tender. The lump was very mobile and was easily made to vanish, especially if pressed towards the pelvis, from whence it could be fished up again. The urine contained a slight trace of albumen. X-ray examination of the renal regions was negative. The shadow of the opaque meal in the ileo-cæcal region is shown in Fig. 2.

Diagnosis.—The case was considered either one of intussusception of the appendix or an enterolith in the caput cæci. The latter condition was considered more consistent with the signs and symptoms and particularly with the X-ray appearances.

Operation.—The usual incision for removal of the appendix was made. (This incision was described by me in the ' Practitioner ' for April, 1912.) The appearances of the cæcal region were very similar to those presented by the first case, though there were fewer adhesions and the cæcum was mobile. A complete intussusception had been prevented by the fusion of the tail of the appendix to the ileum. Profiting by the experience of the former case the appendix merely was removed. This entailed section of a moderately large piece of the cæcum,

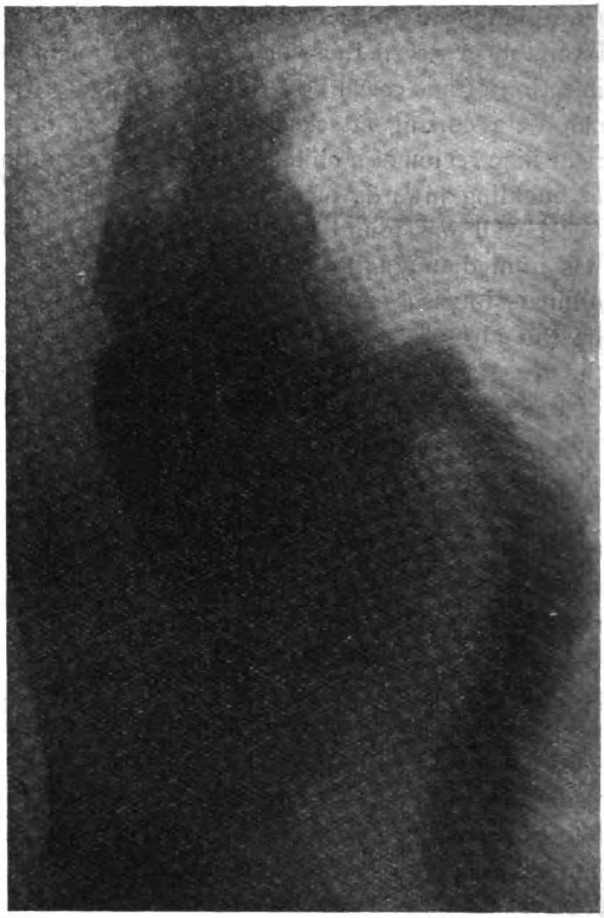

FIG. 2.—Skiagram of opaque meal in ileo-cæcal junction showing the barium surrounding the invaginated cystic appendix.

but apart from this, the operation was no more prolonged nor severe than a simple appendicectomy. Fig. 3 is a photograph of the organ split open after injection and fixation in formalin. It contained a clear gelatinous, slightly laminated albuminous mucus. The actual size of the swelling may be gauged from the skiagram : the distended proximal end of the appendix practically filled the cæcum.

Progress was uninterrupted, and he was able to be out of bed in a fortnight. All his local symptoms disappeared. He was again placed under the charge of the physician, and while still in hospital he had an attack of nephritis, from which he made a good recovery. His abdominal symptoms had entirely gone, and he left hospital well.

The similarity of these two cases is striking. In both the symptoms were chronic. In No. 1 there was entire absence of a history of appendicitis, while in the second the attack of "colic" might be so

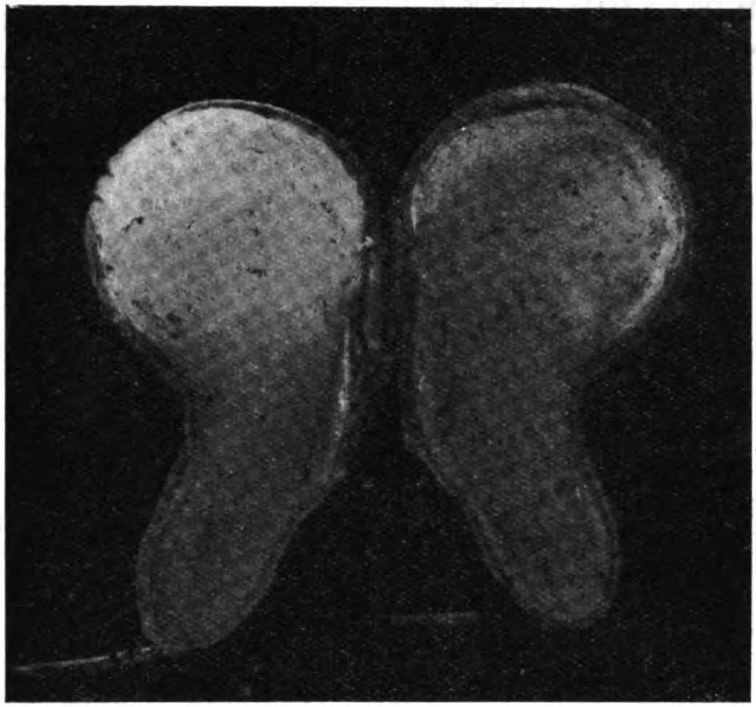

FIG. 3.—The excised cystic appendix injected, fixed with formalin, and bisected.

considered. The tumours in both were alike in size, shape, situation, consistence, and degree of tenderness. Both were mobile, but in one turning on one side caused pain, while in the other standing did the same. In No. 1 the symptoms were confused with those referable to the pelvis, while in No. 2 the general debility, pain in the back, albuminuria and the sunstroke had obviously given rise to the diagnosis of neurasthenia. Further, the opaque meal gave a very clear picture of a foreign body in the cæcum. A plate taken later than the illustration showed the "foreign body" completely surrounded by the barium. Stasis was present in each case though it was not of a pronounced type. I venture to believe that the signs and symptoms of these cases may allow in future of a definite diagnosis of intussusception of the cystic appendix being arrived at previous to operation.

Operative Removal of an Intrauterine Pessary.—O. Möller.—A woman, æt. 36 years, was "treated" at the age of 32 by a Chicago doctor, who introduced a uterine pessary. For some years it gave no trouble; later there had been an almost continuous hæmorrhage *per vaginam*. Menstruation was, however, regular and painless. As she was about to marry and no longer wished to prevent conception, she sought the writer's assistance to get the pessary removed. The introduction of a sound revealed a metallic body in the uterus. Under ether anterior hysterotomy was performed, the pessary was gripped by forceps and with some difficulty removed. Some scanty intrauterine tissue, showing no inflammatory changes, was scraped away. The operation wound healed by first intention. The pessary was 3 cm. long and 1 cm. thick, and consisted of a lower half with a rifled exterior to occupy the cervix, and an upper half designed to open after the introduction of the pessary so that its two blades would press against the interior of the uterus and thus remain securely anchored. Seen some time after the operation the patient was not pregnant.—*Ugeskrift for Laeger*, p. 1527.

THE DIAGNOSIS AND TREATMENT OF NEURASTHENIA.*

By JAMES ALEXANDER LINDSAY, M.D., F.R.C.P.,

Senior Physician to the Hospital; Professor of Medicine in the Queen's University of Belfast.

NEURASTHENIA is a convenient mouth-filling word of modern devising and somewhat indefinite connotation, but convenient as a label for a syndrome of nervous symptoms for which formerly we had no precise designation. The neurasthenic is always with us, and lately the neurasthenic soldier has been very much with us. The literature of the subject is very extensive, and the war has made large additions to it. The subject has become of more general interest than at any previous period. How far the condition is of modern growth is a moot question. Many of the greatest men of genius of the past were undoubtedly neurasthenics —Rousseau, for example, and Pascal—but it seems probable that the disease, if it can be called a disease, is on the increase.

The neurasthenic, unlike the poet, *fit non nascitur*. Hereditary influence, though not negligible, as individuals certainly differ to a considerable degree in their inborn capacity to bear the stress and strain of this mortal life, is slight; but, speaking generally, the disease is exogenous, not endogenous, and is the result of ascertainable causes—hard work under unfavourable conditions, mental fatigue, worry, anxiety, loss of sleep, emotional stress, irregular habits, infective disease. Men suffer in a much larger proportion than women, and the disease falls mainly in the years of middle life.

The following are the main features of the syndrome of neurasthenia:

The patient complains chiefly of a "sense of tire." He is exhausted by slight physical or mental effort and is incapable of prolonged exertion. He is more or less hyperæsthetic, and is irritated by slight causes. He is depressed in mind, and takes a desponding view of his state of health and of his prospects for the future. He complains of pains in various parts. Headaches are seldom absent, and often take the form of a dull, heavy weight in the vertex. A sense of aching pains along the spine is common and pressure points may be present. Digestion is more or less impaired, and nutrition is usually, but not always, lowered. Palpitation is often complained of, but cardiac symptoms may be slight or absent. Sleep is often impaired, but some neurasthenics sleep well. Even if sleep is of normal duration, the neurasthenic wakes unrefreshed, and his morning hours are the worst. He improves as the day goes on, especially if there are many things to distract his mind from the evil habit of constant introspection, which is his special bane. Physical signs are few. The knee-jerks are usually very sharp, but there are some exceptions. The skin reflexes are either normal or exaggerated. The pupils are commonly dilated. The special senses are either normal or somewhat too acute, in keeping with the general hyperæsthesia. There are no paralyses, contractures, spasms, or convulsions, but tremor is common, and is often very marked in the "shock" cases of military practice. There is no definite mental or moral impairment. The neurasthenic is usually irritable and depressed, but his intelligence is normal or above the average, and his moral compass points true. The symptoms show little variation from day to day, but the type varies. One neurasthenic is anxious about his heart, another about his digestion, another about his sexual organs, another about his work or his prospects in life; but the story of the individual has always a certain consistency. There are none of the protean changes which are common in hysteria.

The neurasthenic is much under the influence of circumstances and environment. He is at his worst while alone or in the family circle. While engaged in some not too arduous work, or in cheerful society, or amusing himself with some agreeable amusement, he brightens up and seems quite natural again, only to relapse later into the slough of despond.

The above description refers chiefly to the type of neurasthenia met with in civil practice. Military cases, of which about 2000 have passed through my hands, offer some points of contrast. A large proportion of them are due to shell-shock, wounds, exposure in the trenches, loss of sleep, or the general stress of campaigning under the frightful

* Clinical Lecture delivered at the Royal Victoria Hospital, Belfast.

conditions of modern war. Tremor is usually marked and often excessive. Palpitation, pains about the heart, tachycardia, cardiac arrhythmia of various types, pulse tension often very low but sometimes raised, sweatings, insomnia, and horrible dreams, marked loss of emotional control, vertigo, fainting, fluttering of the eyelids, difficulties of speech, marked increase of the tendon reflexes—all these are common. It is evident that this group of symptoms is in large measure "hysterical," if we can assign any definite connotation to this much-abused word.

The differential diagnosis of neurasthenia is not difficult. The conditions which most closely approximate to neurasthenia are the following: Hypochondriasis, psychasthenia, hysteria, melancholia.

The hypochondriac has a fixed obsession about his health. He dreads the onset of heart disease, brain tumour, tuberculosis, insanity, or other serious affections. Sometimes, having entertained fallen angels, not unawares, he is a syphilophobe. His obsession is fixed and constant and always has relation to physical ills.

The psychasthenic is the victim of obsessions, "phobias," and "imperative ideas." He may suffer from agoraphobia, claustrophobia, or some similar affection. He feels an irresistible impulse to do things which he knows to be improper or wrong. He is sometimes peculiar in manner and may be afflicted by various "tics." Cases of indecent exposure are probably psychasthenic, as are cases of dipsomania and kleptomania. Persons who have to leave their bed at night to make sure that the clock has been wound, the doors locked or the fires banked, are psychasthenics. Dr. Johnson, impelled to touch all the lamp-posts as he passed along Fleet Street, is an example of mild psychasthenia. In the intervals of his obsessions the psychasthenic is often normal.

The melancholic lives in constant gloom. His sky is always overclouded. He has no hope for himself in this world and is often dubious about his prospects in the next. He is frequently inclined to suicide.

The distinction between neurasthenia and hysteria is less clear, and the lines of demarcation are often blurred. Many soldiers, labelled by politeness as neurasthenics, are really hysterics. In typical cases the differentiation is easy. The hysterical woman exhibits marked emotional instability. She laughs and cries on slight provocation. She is very suggestible. Babinski regards this as the essential note of hysteria. She has often areas of anæsthesia and "hysterical zones." The field of vision is often contracted. Convulsions, fits, contractures, aphonia, mutism, retention of urine, and a marked craving for sympathy and attention are often observed. The hysteric, quite in good faith, plays a part in a dramatic scene and drops her *rôle* if the audience is withdrawn.

The treatment of neurasthenia should contemplate the following points:—

(*a*) Removal of any known cause for the affection, such as hard, harassing work, mental stress, irregular habits, neglect of ordinary hygienic rules.

(*b*) Attention to the general health. Most neurasthenics are under-nourished, and a general tonic and roborant *régime* is indicated.

(*c*) Cultivation of will-power and a struggle against the evil habit of introspection. The neurasthenic who can be taught or persuaded to cease thinking about himself and analysing his symptoms is on the high road to recovery.

Severe cases of neurasthenia may benefit by Weir-Mitchell methods, but in ordinary cases these methods only intensify the habit of introspection. Massage, hydropathy, electrical methods may occasionally be of service, but too long persistence in them only does harm. Rest is sometimes good for the neurasthenic, but idleness is always bad for him. Neurasthenic hospitals rightly recognise the extreme importance of workshops, gardening and the like. They promote the all-important element of mental distraction. Too long association of neurasthenics in a special institution is to be deprecated. Mild cases may benefit by travel and change of scene, but fatigue must be avoided.

Definite symptoms—pains, tremors, digestive disturbance, palpitation, tachycardia, insomnia—must be dealt with on general lines. Sedative drugs should be used sparingly. Bromides, arsenic and nux vomica are sometimes of service. Opium and its derivatives should be avoided. Alcohol and tobacco should be withheld, if possible. Tea and coffee should be restricted.

Traumatic Precipitation of Syphilitic Myelitis.—Krag-Möller reports the case of a workman, æt. 43 years, who fell from a height of a yard, striking the right side of his chest against an iron table. He did not resume work, but continued to be up and about. After two days he began to feel a tingling sensation in his right leg, which also became weak. His gait became steadily worse, and after a week he felt some pain in the abdomen. A fortnight after the fall he had to exert pressure on the abdomen to aid micturition, which was neither frequent nor painful. A few days later he had to be catheterised.

On admission to hospital, 17 days after the fall, suffering from paresis of the legs and retention of urine, it transpired that he had contracted syphilis 5 years earlier, and that he had been treated with mercury. His memory was good, and there were no convulsions, headache, or attacks of fainting. The temperature was 99·3° F., and the pupils, which were equal, reacted. Some of the ribs on the right side were tender, but there was no fracture. The liver extended two finger-breadths below the costal margin. Definite hyperalgesia was demonstrable over the right half of the abdomen and thorax, extending upwards to the sixth rib, and downwards so as to include the whole of the right leg. He could lift neither leg. There was slight ankle clonus, especially on the right side. The reflexes were brisk, Babinski's sign was absent, and there was no ataxia, or atrophy. A gumma, dating two years back, had left a scar on the left leg.

During the next few days the spastic paraplegia gave place to a flaccid paraplegia. Below the knees was practically complete loss of all the sensations, and they were impaired over the thighs and genitals and about the anus. He could hardly distinguish heat from cold over the lower part of the trunk up to the level corresponding with the eighth dorsal segment. The patellar and plantar reflexes were sluggish, and no Achilles reflex was obtainable. The ophthalmoscope showed only slight choroid atrophy. The blood gave a negative and the cerebrospinal fluid a positive Wassermann reaction. Mercurial inunction was prescribed. During the next few days there was little change, apart from progressive loss of control over the rectum and bladder. A fortnight later the paraplegia again changed from a flaccid to a spastic form. The sensory disturbances ceased almost completely, and the patient could feebly draw his legs up, but not extend them again. He could also move the feet slightly about the ankles. Seven weeks after admission he was still suffering from spastic paraplegia.

The development of the symptoms was too gradual for simple hæmatomyelia. The course, too, did not tally with this diagnosis. But probably a hæmorrhage into the central nervous system did occur as a result of the accident. Such a hæmorrhage, in an area already devitalised by syphilitic changes in its blood-vessels, had evidently been sufficient to precipitate a true syphilitic myelitis.—*Ugeskrift for Laeger*, p. 1716.

Migration of a Round Worm into the Ear.—H. Coussieu reports the case of a girl, æt. 4 years, who was brought to the writer for pain in the right ear, which began suddenly 8 hours previously. In spite of popular topical remedies she never ceased to cry and the pain seemed to be paroxysmal. He suspected otitis media, but was surprised by the results of the local examination. The tympanic membrane was certainly red and bulging, but the latter was limited to the posterior half; there was no pain in the mastoid region or fever. Examination of the nose and pharynx was negative. Instillations of hot carbolised glycerine and hot compresses were prescribed, with instruction to bring the child on the following day if these means did not bring relief. Twenty-four hours later the child was brought again. She had suffered much since the previous day. The membrane was redder and more bulging. Under local anæsthesia paracentesis was performed, and the writer was surprised not to obtain pus. Hoping the pain would subside after the paracentesis he left the child in charge of a colleague who was summoned on the following day. The pains became worse and worse, and during the night there were an attack of syncope, crises of nystagmus, and general convulsions. The meatus was blocked by a vermicular body, like that produced by pressure on a tube of pomade. The body was seized with a forceps, and a living male ascaris, 15 cm. long, brought away. The child then slept for the greater part of the day. The tympanic incision quickly healed and recovery was complete. No history could be obtained of the passing of worms.—*Rev. de Laryngol., d'Otol. et de Rhinol.*, p. 358.

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INTRA-NASAL CAUSES OF COLDS IN THE HEAD.*

By JOHN F. O'MALLEY, F.R.C.S.,

Surgeon Royal Ear Hospital, Aural Surgeon Evelina Hospital, Surgeon for Ear, Nose and Throat Diseases, Royal Herbert Hospital, Woolwich, etc.

"COLD in the head" is the popular phrase used to denote a certain group of symptoms associated with disturbances of function in the nasal respiratory passages, and, like many other such phrases, is extremely elastic in its application. It is therefore necessary to devote a little time to the consideration of the narrowest and most extensive limitation of the term. Colds in the head are of three types—namely, the true and the pseudo-cold and a mixture of the two.

A true cold presents in the nasal cavity all the phenomena of any acute inflammation—heat, redness, pain and swelling. In addition there is the general symptom of pyrexia. The human nose being essentially a ventilating shaft and depending for its proper function upon its patency, the first of these inflammatory manifestations—namely, swelling—causes a partial or complete obstruction to respiration. Another manifest sign of a cold and a sequence of the inflammatory reaction, which has caused the swelling and obstruction, is an increase of secretion from the cavities of the upper airway. These being such obvious subjective and objective signs, popular usage has come to regard the presence of one or the other, or both, as amply justifying the diagnosis—"cold in the head," and many medical men, unfamiliar with the appearances of a normal, inflamed or diseased nasal cavity, are liable to make the same diagnosis in the same rough-and-ready manner.

* Lecture delivered for the International Fellowship of Medicine.

A true cold presents more or less obstruction, and when fully developed an increase of secretion, in addition to the other cardinal signs of inflammation already mentioned, the heat, redness and pain being the result of an active hyperæmia. In the presence or absence of the latter, together with the other classic signs of an inflammation, lies the essential difference between a true and pseudo-cold.

A *pseudo-cold* presents the obstruction to respiration and interference with the nasal functions of smell and voice-resonance, and in most cases increased secretion, but instead of an active there is at most a passive hyperæmia, unaccompanied by either heat, redness or pain. This is often referred to as a "constant cold."

The third type, or mixture of the other two, occurs when, owing to the presence of factors capable of producing an active hyperæmia, the latter is grafted on a pre-existing passive hyperæmia.

This condition is usually referred to as "frequently catching cold." It is due to the inspiration of infecting organisms through a nose whose physiological defensive mechanism for filtering the air is unequal to the strain, as a result of local diseases which seriously impair its ventilating efficiency. The cases which belong to this group are rather prone to general respiratory infections, both acute and chronic, such as pneumonia and bronchitis.

Even at the risk of repetition I would again emphasise these differences, because on the correct diagnosis will depend the value of the treatment.

Type 1 is an acute rhinitis or intra-nasal inflammation of a temporary nature, most commonly due to infecting organisms and not to climatic changes as its name implies, in an otherwise normal, well-proportioned nose.

Type 2 is not an acute inflammation, nor is it especially due to organisms, though they may be concerned in the repeated attacks which have finally culminated in the chronic condition now present. It is not a cold, but a permanent nasal disease, whose most obvious symptoms are an obstruction or discharge, or both.

Type 3 is a more or less severe acute inflammation occurring in a nose where some degree of chronic disease already exists, and is a rather common complaint in which the predisposing cause is often overlooked for years unless the condition of the nose is carefully investigated. It is obvious that if this is not done and the necessary treatment applied attacks will recur with varying frequency.

A true cold arising in a normal nose is a comparatively rare occurrence, except as a local manifestation of a general respiratory infection, of the type which accompanies the acute specific fevers and influenza.

I must now proceed to consider the various factors concerned in the production of the disturbances of function implied under the comprehensive title of the lecture, and this will necessitate my touching upon the development, structure, physiology and chief common diseases of the nose.

Development of the Nose.

If the nose is regarded as consisting of an upper or ethmoidal and a lower or maxillary region, at birth the upper is about double the height of the lower. This difference gradually diminishes with the development of the face until at the age of 7 or 8 both regions are practically equal, and this relationship persists throughout adult life. The inferior meatus is low and narrow in infancy, the soft tissues of the inferior turbinates touch the nasal floor, and respiration is carried on through the middle meatus only. The nasal passages continue to increase in length until the upper jaw ceases to grow at the period of full dentition, but they have acquired their full width some years previous to this age. Any interference with the proper development of the upper jaw and accessory sinuses or with free nasal respiration may cause these early peculiarities to persist into adult life, and consequently the nose will remain more or less of the infantile type.

This arrest of development is often responsible for the symptoms of obstruction attributed to adenoids, and which persist after the latter are fully removed and lead to the operation being sometimes repeated and discredited. Besides the persistence of varying degrees of immature types, structural irregularities are evolved as a result of conditions of environment and injuries, or by local and general infections such as occur in the exanthemata.

Another important factor which is not sufficiently emphasised in the literature is an inherited anatomical abnormality of nasal formation perpetuating in the offspring certain structural defects existing in the parents, which predispose the indi-

vidual to disturbances of nasal function under the ordinary conditions of every-day life. Amongst these the most pronounced are high narrow cavities, affording even poor ventilation when erect, but which are practically occluded at night as a result of vascular gravitation in the recumbent posture.

Many patients of this type will consult a laryngologist for throat and post-nasal catarrhal symptoms, and they will present unmistakable signs of nasal obstruction, such as spurs, bends and chronic rhinitis, together with the palatal hyperæmia of the mouth-breather; and yet, if the nose is suggested as the cause, they will proudly protest that "they always make a point of breathing through the nose, and even do so when going to sleep." Much of their breathing is done through the mouth during the day and most of it during the night. I mention this point to show how unreliable a patient's statements may be on the question of nasal function even when there is no intention whatever to deceive.

Another great factor in the causation of nasal disturbances of function—and commonly overlooked—is an inherited peculiarity of blood-supply, in which the vasomotor control is more or less unstable and is often observed in persons who are said to have a "bad circulation." These individuals may be specially prone to cold feet and hands and catarrhal susceptibility of the mucous membranes. Under this heading I do not allude to neuroses such as hay-fever and asthma, but to an enfeeblement or want of vigour in the general circulation. The function of the nose under the varying conditions of modern life makes a severe demand on the vascular system, and the accumulation of the effects of small deficiences over a lengthy period becomes finally manifest as some form of chronic nasal disease. In this type of case there is an excessive vascular swing, which is easily influenced by environment, atmospheric conditions and posture, and unless the framework of the nose gives an ample airway the soft tissues of the opposing surfaces are frequently brought into firm contact, and mucous membrane irritation with its consequences is the inevitable result.

Structure of the Nose.

The framework of the nose consists of bone and cartilage, peculiarly designed for lightness and to give the largest possible area of surface, and these are clothed in soft tissues of a specialised type. The human nose is exceptional in the animal kingdom for its unusual prominence as contrasted with the other features of the face; and in the process of evolution the nasal septum is the anatomical part chiefly concerned in this peculiarity, and it is also the structure most liable to irregularities, such as bends and spurs, which may be either congenital, developmental or acquired.

The histological anatomy of the human nasal mucous membrane differs considerably from that of any other part of the body, and in some important points from that of any other animal. Like other mucous membranes, it possesses a protective epithelium, but of a specialised type (ciliated, columnar-celled) peculiar to cavities traversed by air, a loose stroma, a nutritive blood-supply, and a glandular apparatus for throwing out protective secretions.

In addition to this it has a distinct adenoid or lymphatic layer, which responds by hypertrophy to local irritation, as the same type of tissue does elsewhere, *i. e.* in the naso-pharynx.

In the stroma one finds elastic and plain muscle-fibres, which are both contractile elements, and evidently intended to preserve a tonicity or firmness of a mucous membrane subject to considerable changes of volume, and which would without such provision be liable to flaccidity and flabbiness. As a matter of fact the latter condition is found in certain chronic diseases of the nose, where, on histological examination, the contractile elements are found to be destroyed. These elements are markedly diminished in the nasal mucous membranes of the aged, with a corresponding flaccidity, and is probably a factor in causing their greater liability to acute rhinitis.

The most unusual feature, however, is the large venous sinuses, constituting an erectile tissue, and the degree of dilatation of these sinuses and the extent of its distribution in the human nose exceeds that of any other animal. It rapidly grows in volume at adolescence, and is consequently regarded as a secondary sexual characteristic. At this period there is a noticeable predisposition to acute rhinitis, which some well-known writers (Wright and Smith) regard as being due to physiological vasomotor excitement.

Physiology of the Nose.

The nose is essentially a protective organ, jealously guarding the vulnerable territory of respiration, and for this function it is elaborately equipped with a specialised mechanism. That for the full development of the respiratory tract—free nasal respiration—ventilation is absolutely necessary, may be deduced from the evidence presented by children whose chests are ill-formed, in cases of nasal obstruction, and when the latter is removed sufficiently early the former is commonly rectified too. But this by the way as indicating that nature intends the nose as the chief and only true physiological portal to the respiratory system.

It has two main respiratory functions:

(1) To prepare the entering air to more readily yield up its oxygen contents in aërating the blood.

(2) To deprive this air of much impure matter and organisms and reject noxious gaseous material.

The nose and accessory sinuses have a capacity of 120 c.cm., and throughout this extensive space the gaseous contents are in ever-changing contact with a sheet of living membrane, which plays an active and passive *rôle*. The entering air is heated, or in hot climates cooled, moistened and filtered.

The active *rôle* is a natural reflex response to the movement of air, by which the mucous membrane is vascularised and the glandular apparatus set in motion; and the passive is concerned with the entrapping of solid matter and organisms, brought into contact with surfaces covered by a glutinous substance. In this respect it resembles a simple air-filter, but differs from it in being automatic, because the presence of solid matter in the nose stimulates the glandular apparatus to further activity, and the surfaces are flushed free of offending substances, which are expelled, the parts being once more restored to their normal efficiency. So long as this automatic action remains vigorous the nasal function will be satisfactory, and when for any reason it is impaired or breaks down troubles begin to accumulate.

A moderate degree of moisture in the nose is essential to the sense of respiration. Under ordinary conditions of atmosphere and environment the entering air takes up a certain proportion of this warm moisture, giving the pleasant sensation of intra-nasal evaporation. Air which is already very warm and moist gives a sense of suffocation, and patients whose nasal cavities are too roomy or dry, the result of disease or excessive operative zeal, complain of the same feeling, and such a nose is worse than useless to protect the rest of the respiratory tract. The same symptom is observed when the pharynx, larynx and trachea are excessively dry, as in some acute and chronic catarrhal conditions.

A few interesting instances of laryngeal dyspnœa, in connection with the use of the gas-mask and box respirator in the recent war, have come under my notice. As you are aware, the nose is clipped and obstructed and the mouth alone used for respiration. These men complained almost immediately of a feeling of suffocation, and had to remove the masks. The point of special interest was that all of them had nasal obstruction and chronic dry laryngitis, largely the result of mouth-breathing. In a case of this type the partially obstructed nose enables the possessor to carry on his respiration with a moderate degree of comfort. The question of moisture on the mucous membranes of the air-passages is an extremely important one, as the cilia do not carry on their function by waving free in the air, but in a layer of fluid. They are usually credited with being concerned with the removal of foreign particles of solid matter towards the outlets of the cavities, but I believe that their most important function is to bring air and warm moisture into intimate contact and thereby facilitate the more rapid evaporation of the latter.

Diseases of the Nose.

These may be considered under two headings, namely, deformities of the structural framework and diseases of the soft tissues.

Of the former, the septum is the chief structure involved, and these take the form of bends or deflections, spurs, crests and thickenings. They act as impediments to the free ventilation of the nose, and the degree of discomfort experienced in any particular case will largely depend on the site of the obstruction.

Free ventilation implies the necessity of having ample space to permit the entrance and exit of respired air, which under all conditions of environment is sufficient to provide for the full oxygenation of the blood. With the mouth and either nasal passage firmly closed, the other should be capable of carrying on the respiratory function indefinitely without any sense of discomfort. This will allow

a good margin for excessive demands and for reduced activity during sleep, and it is Nature's invariable practice to provide large reserves of function together with the further provision made for adaptation of the same.

Free ventilation also implies that there must be ample room to permit the full exercise of the nutritive and drainage functions of the nasal apparatus, and the absence of dead spaces inaccessible to the entering and outgoing currents of air, where *débris* and secretions are liable to be retained and from which they cannot be expelled by the usual respiratory efforts made for the purpose.

Nutrition plays the chief *rôle* in maintaining the functional efficiency of any organ or tissue, the need increasing proportionately with the greater specialisation or complexity of the part. There is consequently urgent need for the vascular, lymphatic and glandular systems of the nose to have free play, which cannot be possible in the presence of obstruction. The same remarks apply to drainage, as wherever we find a cavity or passage lined by a secreting membrane, suppuration and its sequences will soon become manifest, if for any reason these secretions are unduly retained. The soft-tissue diseases are mostly inflammatory, and when chronic, their deleterious effect is in a large measure obstructive, not only preventing the passage of ample air, but seriously embarrassing circulation and causing more or less stasis. When these inflammatory thickenings are in the region of the ostia of the sinuses, the drainage of the latter is impeded and sometimes arrested completely, and the retained secretion tends to become purulent, which in its turn irritates the mucous membrane, causing increased inflammation and empyema.

Having now taken a general survey of the development, structure, physiology and diseases of the nose, one is better able to comprehend why it is prone to certain disturbances of function, which may first cause slight, next more severe, and later very gross effects on the general health.

Acute rhinitis, or true cold, is more common in the aged and in children than in adult life, and it is also common in the period of adolescence. In children the immature form of the nose, together with the tendency of the adenoid tissues of the nose and naso-pharynx to give an excessive response to infective processes, are largely the cause of this predisposition. In adolescents the physiological vaso-motor excitement already alluded to is a potent contributory cause. In the aged, the intra-nasal changes incidental to the other periods of life are liable to persist, together with the flaccidity of the mucous membrane, to which reference has been made earlier, and in consequence of these the function of the nose and resistance to colds is lowered.

Chronic rhinitis, in which the pathological change is chiefly a vascular engorgement of the turbinate mucous membrane with that of certain areas on the septum, and chronic hypertrophic rhinitis, in which, in addition, there is a connective-tissue increase, are more common in adult and middle life.

In the chronic forms of rhinitis the vaso-motor control is not vigorous, and is in some cases the intra-nasal counterpart of defective circulation elsewhere, and the condition often occurs in congenitally narrow noses.

In hypertrophic rhinitis the stroma and adenoid tissue develop abnormally, consequent on inflammatory reaction, and the circulation is so impeded as to cause, in many cases, cyanosis of the affected parts.

The intra-nasal effects of spurs and deflections are also more observed during adult and middle life, as an obstruction, which in childhood and adolescence was only partial and occasional, becomes permanent later, owing to hypertrophy of the mucous membrane at the seat of constriction, due to repeated inflammatory attacks. This is the "constant cold" stage.

Nasal polypi, which must be regarded as the result of obstructive and nutritive changes plus an infective process, are also commonest during this period, and often come under the popular diagnosis of "cold in the head," or a "constant cold."

Sepsis of the frontal, antral, sphenoidal and ethmoidal cavities, due to infection plus defective drainage, produces the classic obstructive and excessive secretory symptoms of a "constant cold."

All these chronic affections, by impairing function, lower the resistance of the individual and render him more vulnerable to recurring attacks of intra-nasal inflammation, each exacerbation being erroneously referred to as "frequently catching colds."

THE OUTLOOK IN AORTIC DISEASE.

By R. O. MOON, M.D., F.R.C.P.,
Physician to the Hospital for Diseases of the Heart.

In cardiac affections, perhaps more than in any other ailment, what the patient most particularly wants to obtain from the doctor is a forecast of his future condition. True, of course, he may have various symptoms which give rise to more or less pain or discomfort and require relief, but it is not so often the pain or discomfort which brings him to his medical adviser as an anxiety as to what some symptom may portend. It may be some degree of shortness of breath, an occasional attack of palpitation, definite pain in the cardiac region or a vague sense of oppression in the chest, feelings of faintness, or the sensation of the heart missing a beat.

Nowadays there is a general tendency to take a more favourable view of all forms of heart disease than was customary some 20 years ago. Whether this is a result of more accurate scientific observation, or whether unconsciously physicians are affected by the prevailing philosophic optimism it might be difficult to say. But my own experience, as far as it goes, leads me to consider that the more optimistic view of cardiac affections is fully justified as a result of more extended observations. At the same time it is desirable to introduce as much precision as possible into the prognosis of individual cardiac lesions.

Those of us who have been in the army, or connected in any way with military hospitals on their medical side, must often have been astonished to find a man, with some obviously organic disease of the heart, who has done his work as an infantry soldier for a year or so without experiencing any special distress. Recently there have been recorded in medical journals quite remarkable feats of endurance performed by men suffering from aortic disease. However, just as our legal friends say that "hard cases make bad law," so we must say that these remarkable cases do not form a good standard for ordinary medical practice.

In order to lay down any rules as to the cases of aortic disease which are likely to run a favourable course, it is important to distinguish between the various causes which may damage the aortic valves. On the one hand, there is the group of cases due to rheumatic fever, chorea, or some infective disease; on the other hand there is the group due to degenerative conditions connected with arterio-sclerosis, having such antecedents as lues or strain. The former first manifest themselves in early adult life, while those of degenerative origin are met with from the age of 40 onwards.

Nearly all the remarkable cases recorded of great endurance and hard work, in spite of aortic disease, have had rheumatism or chorea as their cause, and the rheumatic affection in such cases appears to have fallen entirely on the valves and not at all upon the heart-muscle, so that, since the cardiac muscle is unaffected, the ordinary working capacity of the heart continues to be unimpaired; but of course, the damage done to the valves does render its ultimate reserve capacity less. Doubtless, the fact of having had one rheumatic attack makes it more probable that another may occur; still, with advancing years, additional attacks of rheumatism falling mainly upon the joints, are much less likely to affect the heart. It is in these cases that a quite favourable prognosis may usually be given. Now, as regards the occupation suitable for such a case, no one who had the opportunity of advising at the outset would hesitate to recommend some quasi-sedentary work; on the other hand, should the case be seen first when the man is already engaged on definite manual labour, albeit not exceptionally hard, one should hesitate very much about insisting on a change of occupation, if the symptoms are quite slight and there are no obvious signs of failing compensation. The essential thing to my mind is that a man's work should be regular and that his hours, meals and general habits should be regular also. Leading such a life relatively laborious work can be done, whereas an occupation which may seem superficially easier, yet involving much change in the work and irregularity may be fraught with more risk. What a man loses by this lesion is the natural elasticity of the healthy man so that he ought not to work by spurts whether with his mind or body.

To reject everyone who has aortic disease for the civil service *sans phrase* is a clumsy and wooden method of proceeding, and would not be done were it the object of governments to consider the

welfare of their citizens as a whole and not the supposed interest of a particular department.

The cases then which occur in early adolescence and are due to rheumatism may often be latent for a long time, and the aortic lesion may be discovered only on a routine examination, having never given rise to any symptoms, or it may be revealed accidentally, so to speak, on an examination for life insurance. Such patients may continue their work for years with very little inconvenience.

In speaking of the generally favourable outlook for cases with aortic disease when they follow rheumatic fever we must enter a caution in the case of young children. All rheumatic affections are apt to damage the heart more seriously when they occur before puberty than in early adolescence or later; a child with the aortic valves damaged has but a poor future in prospect. Recently I have had under my care in hospital a young man with aortic disease, whose heart was first damaged at the age of 13. He appears to have been carefully treated then, for he was kept in bed for 5 months. Again, 2 years later he had another attack of rheumatism and was kept in bed 3 months. At the age of 24, when I first saw him, he had aortic regurgitation and stenosis with a greatly enlarged heart. Though he made some improvement from time to time, he had to lead the life practically of an invalid for the next 5 years, when he died at the age of 29. The autopsy showed a heart weighing 37 oz., the aortic valves thickened and cartilaginous-like: the mitral valve was quite unaffected. In my experience aortic cases due to rheumatism which occur before puberty nearly always do badly.

When we come to consider aortic disease of degenerative origin the picture is different. Here the disease is more insidious. As a rule, too, it occurs in older patients, being exceptional before the age of 35. Clearly, the prognosis must be worse because the lesion is progressive; the cause which gives rise to the lesion is still present and cannot be removed, though its baleful influence may be lessened by judicious treatment. Then, too, the patient has generally passed the meridian of life and is on the downward grade, so that all the other agencies connected with a decreasing vitality come into play.

Looking now at the individual lesions; the prognosis in *aortic stenosis* is well known to be much better than in aortic regurgitation, it has, in fact, been called the lesion of longevity. But here it should be pointed out that aortic stenosis is often far too readily diagnosed, for in later life a systolic murmur audible over the aortic area is quite common, it may perhaps be due to some roughening of the valve, but is certainly not to be taken as adequate evidence of a real stenosis. Assuming, however, that there is a definite narrowing of the aortic orifice, as evidenced by a thrill as well as a systolic murmur in the aortic area, with perhaps some smallness and retardation of the pulse and an absent or diminished second sound, what is to be our prognosis? Such cases are generally the result of an acute endocarditis induced by rheumatic fever, chorea or scarlet fever. The arterial form of pure stenosis is much less common, for the simple reason that the general sclerosing process which gives rise to the obstruction at the aortic orifice also renders the valves incompetent, so that we have the double lesion. In an ordinary case, then, of aortic stenosis due to endocarditis, the lesion may well remain stationary for years unless a fresh attack of rheumatic fever damages the valves still further. Early symptoms of a failing compensation, such as præcordial distress and dyspnœa on exertion, should be carefully noted, for when once compensation has failed in a case of aortic stenosis our power to restore it is less than in the case of other valvular lesions. Speaking generally, there is no inherent tendency to sudden death in aortic stenosis as there is in aortic regurgitation, but the left ventricle grows slowly weaker and so tends to a gradual and not a sudden dilatation.

The continued high pressure in the left ventricle may after a time affect the mitral valve, which gives way and we have the signs of mitral regurgitation. For a short time this yielding at the mitral orifice, by acting as a safety-valve to the left ventricle, may seem beneficial, but the increased pressure soon makes itself felt in the pulmonary circulation and all the ill results of backward pressure ensue. This condition of things may be removed again and again by rest and suitable treatment, in particular the administration of digitalis in a simple case of mitral regurgitation, but when there is an irremovable obstacle at the aortic orifice, little permanent good can be expected from any line of treatment. As compensation is failing the serious

symptoms that show themselves are mainly respiratory; the patient suffers from severe attacks of dyspnœa and orthopnœa, a bad cough frequently develops, and there may be pulmonary hæmorrhage.

Aortic stenosis has often been found associated with pulmonary tuberculosis, so that this lesion may be said to be favourable to the development of phthisis; perhaps in consequence of the general malnutrition which is induced by the obstruction at the aortic orifice; in making a prognosis this possibility should be kept in view, particularly if there is any family history of tuberculosis.

Aortic regurgitation.—This, of course, as is well recognised, is a far more serious lesion than pure aortic stenosis, but here again in young subjects, as we have said before, it is astonishing how effective the compensation may be in these cases which have been caused by acute endocarditis. Provided the patient avoids sudden and violent exertion it is wonderful what a large amount of continuous labour can be endured without apparently damaging the compensation.

This lesion is nearly always accompanied by great hypertrophy of the left ventricle, the extent of which may be regarded as some indication of the amount of regurgitation. It is this concomitant hypertrophy which gives rise to the symptoms of headache, dizziness, and disturbance of vision which are so frequent in aortic cases, while the cerebral anæmia makes these patients find intellectual work specially fatiguing, and is also the cause of their frequent irritability of temper.

The increased volume of blood which is discharged with additional force at each systole into the aorta and arterial system produces a continually recurring strain on the vessel walls, thus giving rise to chronic inflammation of their coats and often to dilatation of the aorta, and it is in these cases specially that pain and symptoms of angina arise. The dilatation of the left ventricle, when it occurs, is always an unfavourable sign and, *cæteris paribus*, the greater the dilatation of the left ventricle in aortic regurgitation the worse is the prognosis.

Sudden death from syncope or inhibition may befall young patients who are apparently doing satisfactorily; this, however, is more rare than is generally believed. Though there are risks of cerebral embolism and pulmonary apoplexy, both these events are far less common than in mitral cases.

Recently, I have been much impressed by seeing several cases of aortic regurgitation pass successfully through attacks of lobar pneumonia, which puts a very severe strain upon the heart, but they were patients of healthy and temperate habits, which is always a matter of great importance in heart disease.

When the aortic regurgitation is due to degenerative changes the outlook can never be good. The condition may seem to be stationary for a time and when lues is the cause great relief of symptoms can be looked for by the use of iodide of potassium and arsenic. Continuous improvement, however, can scarcely be expected owing to the changes in the coronary arteries. It is these changes in the coronary arteries which cause the most serious symptoms connected with aortic disease, namely, attacks of angina, which are important, not only because of the intense pain, but because they indicate that there is probably great degeneration of the cardiac muscle and a consequent likelihood of sudden death. In the cases which are due to lues one should be particularly cautious in the prognosis which one gives, as it is these cases especially, in my opinion, which show the greatest liability to sudden death, probably due to the fact that the myocardium no less than the aorta has been damaged by the luetic poison.

As to physical signs in connection with the prognosis, changes in the character of the murmurs are not really of much importance. Alterations in the cardiac dulness are more valuable, an increase in the transverse area of dulness being usually a bad sign, whereas the increase vertically may be a relatively good one. When muscular effort instead of raising the blood-pressure has the effect of reducing it, we must regard this as of sinister significance.

In all these cases much importance should be attached to heredity and the general family history, also to the temperament of the patient, as some temperaments by their equality act as an important reinforcement to treatment.

A PECULIAR CASE OF ACUTE LEUKÆMIA.

By GORDON WARD, M.D.

THIS case was seen in consultation with Dr. Henry Hick, of New Romney, who kindly supplied me with the temperature chart and clinical details.

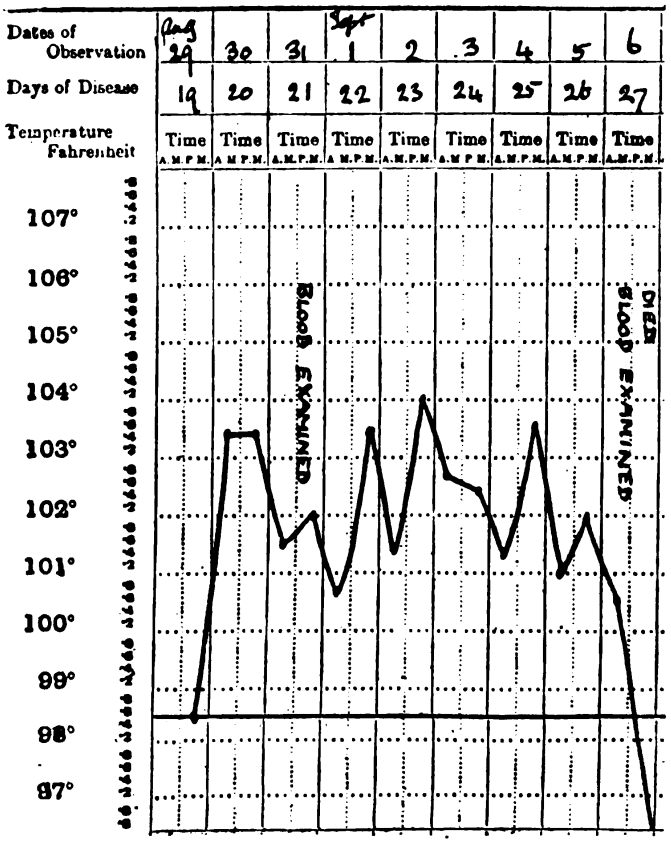
J. H—, æt. 18 years, was employed as a baker's assistant, and later in the service of a golf club. His illness dated from three weeks before I first saw him (on September 1st, 1915), but he did not take to his bed until August 30th, 1915, *i. e.* eight days before death. His earliest symptoms were an attack of diarrhœa which lasted only a very short time, and pains in the legs. When first seen he looked pale, maintained a rather rigid attitude, and was covered with minute purpuric spots. His mother stated that he had had a profuse epistaxis on August 26th, 1915. His spleen was enlarged to the level of the umbilicus, there was a minute gland palpable in the right axilla, but his chief complaint was of pain in the legs. The throat was normal. When next seen on the day of his death he was of a ghastly greenish pallor, and showed mental symptoms. The splenomegaly was much less. He was obviously but a little way from death.

The following features of the case deserve more detailed attention.

Signs of hæmorrhagic tendency.—Neither the patient nor his mother could date the onset of purpura although the spots were very prominent. They numbered perhaps between 200 and 300, and were all of the same type and of very nearly the same size. Each spot was about one-sixth of an inch in diameter, sharply circumscribed, and not fading on pressure. The colour was in most cases bluish, and the great majority of spots were on the legs, even on the soles of the feet; a fair number were located in the right antecubital fossa, but the trunk and neck showed few spots. The question of their being flea-bites arose, but the distribution, the absence of irritation and of fleas, and the failure to find any over-lying lesion of the skin seemed to negative this. It may be pointed out that this is not the type of purpura usually seen in acute diseases of the blood-forming organs. It is more usually associated with such conditions as epidemic diarrhœa in children, with tuberculosis, etc. In leukæmia large blotches relatively few in number are more common, as they are in all acute toxic purpuras. Beyond the purpura the chief sign of the hæmorrhagic tendency was the one profuse nose-bleed which the mother noted as being "unlike ordinary nose-bleed," and "coming in big clots." During the last week of life there was slight oozing from the gums, and again slight epistaxis, but there was not more than an occasional trace of blood, and never a definite flow. It may be noted that there was no blood in the urine or fæces. The former was dark in colour, but the fever, and also, perhaps, the excretion of urates in increased quantity, which is a feature of leukæmia, probably accounted for this.

There was never any sponginess of the gums, which were in fact unusually healthy, and the type of purpura was unusual; but otherwise these signs of the hæmorrhagic diathesis were what one would expect in acute leukæmia.

The temperature chart shows that a normal temperature on the night of August 30th, 1915, gave way to one of 103·4° F. on the next morning, and thereafter it remained high until death. Often in acute leukæmia there is an added acute



septic intoxication, originating in the mouth or pharynx, but this was quite absent in this case. Even at the last, although the mouth was dry and spattered with flakes of milk, there was no suggestion of septic trouble. The diarrhœa, too, had vanished, and the stools were normal. The pyrexia was, it seems, an integral part of the disease (acute leukæmia), and is to that extent of particular interest.

Signs of involvement of blood-making organs were as follows, viz: Splenomegaly, one slightly enlarged gland in outer wall of right axilla and bone pains. The bones were, generally speaking, not tender, although percussion or pressure on the iliac spines was resented; there was no enlargement of the liver or hypertrophy of the oral lymphatic tissue. It is difficult to connect the one gland very definitely with the disease, and the bone pains were also of unusual type, if, indeed, they could be called bone-pains. The first pain was in the left hip, but it stayed there a very short time, and thereafter pain was in the right hip, where any possible influence of the spleen seemed out of question. This pain radiated down the inside of the thigh to near the knee, but was otherwise localised to about the region of the anterior superior iliac spine. The generally rigid attitude was also suggestive of bone pain or uneasiness. The pains did dominate the picture to a very marked extent. Bone-pains with or without tenderness on percussion are not infrequent in leukæmia, are less frequent in the lymphatic form, and very seldom so extreme as to excite much attention from the patient or the medical attendant.

The splenomegaly was very marked on the first occasion—the usual massive solid-feeling enlargement of myelæmia—but on the second was much diminished so that only the lower pole was felt as a projection about 1½ in. below the ribs.

The blood examinations (at six days' interval) were as follows:

Red cells	4,130,000 per c.mm.	1,410,000
Nucleated red cells	28 per c.mm.	98 per c.mm.
Hæmoglobin (Sahli)	50 per cent.	18 per cent.
Colour-index	0·609	0·642
White cells	4700	1400
Platelets	None noted	Very few
Polymorphs	10·2 per cent. (480)	38·0 (532)
Eosinophils	None noted	0·2 (3)
Mast-cells	None noted	0·2 (3)
Transitionals	None noted	1·0 (14)
Small mononuclears	80·8 per cent. (3798)	45·2 (633)
Large mononuclears	8·8 per cent. (414)	15·4 (215)
Mitotic figures	37 per c.mm.	One only seen

The qualitative changes in the red cells, polychromasia, etc., were not well marked except in the nucleated red cells, which were all normoblasts. Most of them showed some irregularity of the nucleus.

In both cases 500 cells were counted for the differential count: the numbers in brackets are the actual numbers of each cell per c.mm.

These results are remarkable. On the first occasion all varieties of cell except the mononuclears were markedly diminished, on the second even these were much below normal. This, of course, is not what one expects to find in leukæmia. It would point to a sudden fall of the count—which is well known as a rather rare happening in leukæmia—coincident with an acute (clinical) exacerbation of the disease. On the other hand, one may suggest that the treatment (30-minim doses of Fowler's solution) had, in spite of the lateness of its application, begun to have an effect on the morbid proliferation of lymphocytes and perhaps on the anæmia, too, as the colour-index was maintained and the number of nucleated red cells trebled. It is true that the effect came too late, but since we do not know what is actually the cause of death in acute leukæmia this does not affect the argument. The cause is certainly not anæmia *per se* in most cases.

Mental symptoms.—Towards the end of life he was delirious in the evening, as is common in pyrexial cases; but he had also even in the daytime and when rational as to other points a complete lack of insight into his condition. He repeatedly asked to be allowed to walk down the street, and attempted to rise from his bed for the purpose. He seemed sure that he could do so on the morrow although not allowed to-day, nor did he appear to realise that his physical condition was a factor in the matter. Such mental symptoms are common enough but do not perhaps attract the attention they are entitled to amongst alienists. They form the great majority of all cases of acute toxic insanity and their relation in particular to anæmia might well be worth study. A not inconsiderable number of cases of Addisonian (pernicious) anæmia have ended their days in

asylums. Perhaps the fact that the cerebral centres are deprived of their required supply of oxygen is a factor in these cases, for insanity is also a well-known sequel to coal-gas poisoning in which the oxygen exchange must certainly be much disturbed.

Diagnosis.—The diseases associated with massive splenomegaly, anæmia and an acute course are few—practically only the two varieties of leukæmia, viz. myelæmia and lymphæmia. Massive splenomegaly is almost as uncommon in lymphæmia as is the absence of palpable lymph-glands. Yet it is to this class that the case under consideration at first sight seems to belong. Of the small mononuclears a certain number were of the ordinary hæmic type with fuchsinophil granules, but the majority were practically devoid of anything but a fringe of ragged cytoplasm and a very deeply staining featureless nucleus. In such circumstances it is unwise to dogmatise on their origin—they may possibly have been mother-cells of such a generation that they were potential ancestors of either lymphocytes or myelocytes. The cells which showed mitosis were mostly large, but a few were of the sort that one finds in lymphæmia. The large mononuclears were possessed of two nucleoli for the most part, a relatively large nucleus and deeply-staining blue cytoplasm. These might well have had their origin in the marrow. This may possibly have been an example of acute myelæmia, and the advanced cellular pathologist would perhaps give an opinion which would accord better with the clinical picture —but probably not a very confident one. Unfortunately no autopsy was permitted.

No other diagnosis except leukæmia was really tenable, so that the low white-cell count appears the more remarkable. It is well to bear in mind that an absence of leucocytosis no more precludes a diagnosis of leukæmia than does a lack of displacement prove that there is no fracture of the leg, although both are most excellent signs when present. The presence of white cells in mitosis is, at the same time, just as valuable in the diagnosis of leukæmia as is the detection of definite crepitus in a fracture.

THREE TYPICAL CASES.

By E. MANSEL SYMPSON, M.D., B.Ch.Cantab., M.R.C.S., Hon. Lieut.-Col., R.A.M.C.(T.).
Surgeon to the County Hospital, Lincoln.

Spindle-celled Sarcoma of the Femur.

Case 1.—A girl, æt. 17 years, was admitted under my care into the Lincoln County Hospital complaining of pain and swelling of the right knee, which had been troubling her for 4 months. A year previously she had knocked her knee against a bed-post, after which it was stiff for a few days. Four months ago it began to swell and to ache considerably, and had gradually got stiffer and hurt her very much.

The right knee was very much swollen and painful on movement; it lay in a semi-flexed position, and could only be extended with difficulty. There was some lipping of the lower end of the femur; no riding of the patella. Measurement round the centre of the patella of the left knee gave 12¾ in., of the right knee 14½ in.; round the condyles of the femur on the left side 13 in., on the right side 16¼ in. There was more swelling on the internal aspect than on the external. The thigh was rather everted. Aching and boring pain worse at nights; no pain on passive movement. She had been resting it for three weeks before admission, during which time the size of the knee had remained the same. The knee movements were limited, and there was a tubular swelling, firm and somewhat elastic in character, involving the lower end of the shaft of the femur. The internal condyle was larger than the external one. There was no œdema over the swelling or around the joint (and no apparent fluid in the joint), but an area of redness was present.

There was no crackling. The joint was commencing to become subluxated and the leg was everted. The internal condyle was growing seemingly from want of support. There were no enlarged glands in the groin. Her temperature was 99·6° F. on admission. There was no family history of any tumour, joint or glandular trouble.

She was placed on a tonic of hypophosphites, and the knee was treated with Scott's dressing. After she had been in about 3 weeks, as there was no improvement and the pain continued to

be very severe, the knee-joint was opened under an anæsthetic, and was found to contain some fluid. The swelling of the femur was to all naked-eye appearance a periosteal sarcoma growing into the joint, and with some ossification commencing. Amputation was performed at the junction of the upper and middle thirds of the thigh by the method of skin-flaps and circular division of the muscles. She made a complete recovery. The report of the Clinical Research Association on the tumour was that it was a spindle-celled sarcoma.

This was one of those always interesting cases of malignant disease of the knee which in some respects simulate tubercular joint affection. There was not, however, the general apparent enlargement of the knee-joint, so often present; the amount of pain also was quite excessive for tubercular disease. The most suspicious feature was the enlargement over the inner condyle, and the way in which the swelling appeared to wrap round the lower end of the femur.

Tubercular Peritonitis.

Case 2.—The patient was a girl, æt. 13 years. For about a month before coming into the hospital she noticed her abdomen was swelling, and she could not get her clothes to meet. She had not had much pain, but the belly hurt her somewhat when she moved about or stooped much. The skin was coloured rather darkly, ascites was present, and tenderness to touch over the greater part of the abdomen. She was an anæmic, thin and delicate-looking girl, with, however, a good appetite. There was no history of consumption or tuberculosis in the family. Median laparotomy was performed, the patient being anæsthetised with chloroform, and the peritoneal cavity was full of a large quantity of fluid. Grey-looking granulations could be seen and felt on the surface of the peritoneum and intestines. The cavity was washed out with sterilised water, and the laparotomy wound sewn up in layers. Three months after the operation the patient was perfectly well, the wound healed up by first intention, and she was fitted with an abdominal belt and sent home. Four months later she was seen by me, and found to be completely cured. The ascites had gone; the girl looked and felt strong and well, and had got quite fat and rosy. The case is a good example of the value of simple incision in tubercular peritonitis. This may be with or without washing out the peritoneal cavity, which does not appear to be necessary; it was done in this case because the fluid present had a rather dirty greyish look, so some cleansing seemed to be required.

Sebaceous Cyst of Neck.

Case 3.—The patient was a lad, æt. 20 years, who complained of a lump beneath his chin which he thought came on after a cold, and has been growing larger for the last 5 or 6 years. There was a large circumscribed soft swelling extending from the angle of his right lower jaw to 1 in. beyond the middle line of the neck, and from the ramus of the jaw to the thyroid cartilage, to neither of which parts was it fixed. The skin over the swelling was freely moveable; the fingers could feel all round it, and it moved very little on swallowing. The floor of the mouth was raised, and had a soft fluctuating feel to the touch. Under chloroform the cyst was opened, evacuated and scraped, and the wound sewn up. Its contents were a material having exactly the appearance and palpable sensation of lanoline. The fact of its being uncommon to meet with a large sebaceous cyst in the position it occupied in this patient seems to justify its being recorded. It had no characteristics of a dermoid cyst.

The Motor-Car in the Treatment of Whooping Cough.—Challamel reports several cases of whooping-cough in which the cough ceased after a few drives in a motor-car. He attributes this to a rapid and prolonged aëration of the respiratory system. He considers that it ought to be used as early as possible in the disease, but of course any fever is a contra-indication. Several of his cases had a few bronchitic *râles* in the chest, but were equally benefitted with the others. The child should be well covered, facing the engine in an open car. A drive of two or three hours is recommended. In some cases the cough ceased after one drive; in others three or four were necessary. —*Brit. Journ. of Children's Diseases*, April–June, p. 110.

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THE SURGERY OF GASTRIC ULCER.*

By F. J. STEWARD, M.S., F.R.C.S.

ULCER of the stomach may be either single or multiple. In most cases a single ulcer is present. The tendency is for an ulcer to occur mostly in the neighbourhood of the lesser curvature, and more often to the right—that is to say, towards the pyloric portion of the stomach, the incidence becoming less and less as you pass away from the pylorus and away from the lesser curvature. But any part of the stomach may be affected.

Several things may happen to a gastric ulcer.

(1) It may *heal*, either with or without treatment. The grounds for that statement are these: In observations made on the stomach post mortem far more scars of healed ulcers are found than open ulcers; hence the presumption is that many ulcers heal. Then there is the result of medical observation. Many physicians hold very strongly from their experience that a large proportion of gastric ulcers heal as the result of treatment. I do not attach great importance to figures, but Lenhartz claims that more than 75 per cent. and Bassler that 95 per cent. of all classes of gastric ulcer are cured by medical treatment. The case is better put in general terms, I think, namely, that the opinion of those who ought to know—those who have given a great deal of time and attention to the subject—is, that a large proportion of gastric ulcers heal as the result of medical treatment.

(2) A gastric ulcer may *perforate*. I am leaving out of consideration perforated gastric ulcer.

(3) The ulcer may *bleed*. Bleeding from a gastric ulcer is extremely variable in type. For instance, a patient with gastric ulcer may suddenly get a hæmorrhage which may be fatal in an hour

* Clinical lecture at Guy's Hospital.

or two. At the other end of the series are cases in which patients have more or less continuous slight hæmorrhage, which is only recognised as occult blood in the fæces. Between those extremes one may meet with almost any degree. The common occurrence, perhaps, is sudden hæmorrhage: the patient is attacked with faintness, and shortly afterwards brings up a quantity of blood. As a general rule the hæmorrhage stops of itself, probably owing to the diminution of blood-pressure by the sudden loss of blood leading to blocking of the bleeding vessel by clot. The bleeding in many cases recurs, in days or weeks or months, or even only after years. I have notes of a case which I shall read to you presently, in which a man had a hæmorrhage 15 years ago, another 10 years after that, and another 5 years later still.

(4) The fourth result is *cicatricial contraction.* Ulcers, especially those in the pyloric region, tend to cause contraction as they heal and cicatrise, and the result is pyloric obstruction, which is often very marked, so that the pylorus may be almost occluded. A very considerable proportion of cases of gastric ulcer which are recognised clinically and at operation are found to have caused a good deal of obstruction at the pylorus. Cicatrisation may also occur owing to the contraction of an ulcer in other parts of the stomach, causing what is known as "hour-glass" stomach.

(5) Fifthly, simple ulcer of the stomach may become *malignant.* It is very difficult to say how often a gastric ulcer becomes malignant. When you see malignant disease of the stomach, either on the operating table or in the post-mortem room, it is often difficult to say whether or not it is the result of a simple ulcer, though some undoubtedly are. Moreover, opinions on the subject vary very much. At the same time there is no doubt that a certain proportion of the patients operated upon for an apparently simple ulcer of the stomach die of cancer of the stomach. The only statement of any definite proportion I have come across is that of Eiselsburg, a well-known authority on gastric disease, who says that 10 per cent. of his cases of gastric ulcer which were operated upon died of cancer of the stomach. Moynihan, again, has stated that more than 72 per cent. of gastric cancers are undoubtedly preceded by simple ulcer. A curious fact is that although gastric ulcers do become cancerous, yet duodenal ulcers do not, in spite of the fact that ulcer of the duodenum is commoner than ulcer of the stomach. Sir John Bland-Sutton recently went so far as to say that cancerous change in a duodenal ulcer is unknown.

In dealing with the symptoms of gastric ulcer, it is best to consider the cases in three groups. In the *first group* symptoms are absent. Many people who have gastric ulcers have no symptoms. I have operated upon a number of patients for perforation and have often questioned them, and found they had had no previous symptoms and had no idea whatever that anything was the matter with them. Moreover, gastric ulcers are found unexpectedly post mortem.

The *second group* is best described as *atypical.* A certain number of patients complain of symptoms that do not suggest gastric ulcer and are found to have gastric ulcers, either at post-mortem examination or on the operating table. Sometimes these patients have symptoms of other well-known conditions. For instance, in a considerable number of cases operation for supposed gall-stones reveals gastric ulcer. It may be very difficult to distinguish gall-stones from gastric ulcer. Other cases of ulcer are diagnosed as adhesions and chronic appendicitis. Some are indefinite to such a degree that an operation is undertaken purely as an exploratory measure, and a gastric ulcer found.

The *third group* may be described as *typical.* The typical symptoms of gastric ulcer are as follows:

First, *pain.* The amount and degree of pain are variable, partly because no two people interpret the same amount of pain in the same words. Still, pain is one of the definite symptoms of typical cases of gastric ulcer. As a rule the pain is intermittent. A patient will tell you that he has had symptoms of indigestion—pain after food, in attacks, for 5 or 6 or 10 years. He will have a bout of pain which will last, perhaps, a month. Possibly as a result of exercising more care in diet and by rest, or a regular course of treatment, he gets better, and may remain entirely free for some considerable time, after which the symptoms will come on again. If these patients suffered from continuous pain, never being free of it, they would probably be seen much earlier. The reason one sees so many cases of gastric ulcer in people who have had the symptoms for years is, that while they are making up their minds about going to a hos-

pital or consulting their doctor they begin to get better of that attack, and they put off any steps towards being dealt with until they have another bout. The site of the pain is almost always in the epigastric region, sometimes a little more to the right, sometimes a little to the left, sometimes going through to the back. But it is always more or less epigastric.

The next point is, that the pain is related to food. Patients who have gastric ulcer are always more comfortable when the stomach is empty, and their best time is in the morning, before they have had anything to eat. They will mostly tell you that the pain comes on after food. The period after the ingestion of food which elapses before the pain comes on varies greatly, and to some extent according to the position of the ulcer: the nearer the ulcer is to the pylorus, the later after food the pain is likely to come on.

The second symptom is *vomiting*. Many patients with gastric ulcer are sick, generally in bouts, as with the pain. Mostly they say the sickness makes them feel much better. Of course there is more liability to sickness if the patient has definite obstruction from cicatrisation of the pylorus with consequent dilatation of the stomach. But vomiting is common quite apart from pyloric obstruction, and may possibly be due to irritability of the stomach, just as ulceration of the bladder causes irritability and frequency of micturition.

On the other hand, some patients are not sick at all, even though obstruction is present. Quite recently I operated upon a lady who had never been sick. She had had symptoms for 4 years, and a large proportion of her bismuth meal was present in the stomach 8 hours after she took it. That indication of obstruction was confirmed at the operation, because the pylorus was much obstructed by a cicatrising ulcer. Sickness, therefore, is not a constant symptom.

We next come to *local tenderness*. That is fairly constant. On examining the abdomens of patients with gastric ulcer, in a large proportion tenderness is found somewhere round about the epigastric region. But the degree of tenderness, both in the same patient at different times and comparing different patients, varies a good deal.

The results of X-ray examination I cannot got fully into. There are, however, 3 principal points. The first is, that in a considerable proportion the bismuth meal is found to be hurried out of the stomach, showing that the organ is in a hypertonic or irritable condition. The second is that in a large group of cases the reverse is the case, for in cases with obstruction more or less of the bismuth meal will remain in the stomach 5 hours or more after the meal was given. Thirdly, an irregularity in the normal outline of the stomach may occasionally be made out and may indicate the actual site of an ulcer.

The cases of gastric ulcer in which operation is needed fall into two classes:

(i) Cases of uncomplicated gastric ulcer in which a fair trial of medical treatment has been made and has failed to relieve the symptoms.

(ii) Cases of gastric ulcer complicated by:

- (*a*) Perforation.
- (*b*) Hæmorrhage.
- (*c*) Pyloric obstruction or hour-glass contraction.

The following is a good example of the type of case, coming under the head of the first indication—*failure of medical treatment*. A lady, æt. 35 years, had for many years suffered much from attacks of very bad pain, which had become more and more frequent, in spite of care in regard to diet. These attacks of pain had been associated from time to time with vomiting. When I saw her, her diet had been, for 12 months, limited to milk; and during the last few months, in spite of the fact that she was taking nothing but milk, she was getting more and more pain, so that her life had become intolerable. I operated in July, 1911. I found an ulcer on the anterior wall of the stomach, with much thickening round it, and about 1 in. away from the pylorus. I did a posterior gastro-jejunostomy, and she has not had any trouble since. Seven years after the operation she could eat and drink anything, and had not had any signs of indigestion nor any of her old pain.

When gastric ulcers were first operated upon—which is not so very many years ago—the operation which was always done was gastro-jejunostomy. The main reason for this was that it in the first place relieved obstruction, and as, in a considerable proportion of cases of gastric ulcer, obstruction was present, the result was extremely satisfactory. In other cases, in which there was no obstruction, it

was thought the patient would be benefited by the fact that as the contents of the duodenum flowed into the stomach, the gastric contents would be kept more or less alkaline and the ulcer would in consequence heal. Some surgeons still hold that that is a very important factor. As time passed it became clear, however, that gastro-jejunostomy alone did not always produce the hoped-for results. For this reason, and also on account of the danger of subsequent cancer, other methods of treatment have, in recent years, been advocated.

With regard to the results of gastro-jejunostomy, it is necessary to remember that there is a mortality which is variously put by different writers between 2 and 10 per cent. In the practice of surgeons who do many gastric operations the mortality will only reach the lower figure, while in the hands of less experienced operators it will be higher. Sometimes the patient dies because the hæmorrhage for which the operation was done continues. Others, owing to their vitality being much diminished by perhaps years of semi-starvation, easily get bronchitis, pneumonia, etc., and a certain number succumb to these complications. Probably the mortality from simple gastro-jejunostomy is being diminished as surgeons become more skilled, and everything connected with surgery gets more refined. As regards final results, it is probable that gastro-jejunostomy alone will cure about 60 per cent. of the cases of gastric ulcer which require operation, but the higher the proportion of cases with obstruction the better will be the final results.

With regard to other methods of treatment, sometimes the ulcer is excised, either with the knife or by the cautery, so securing a bloodless removal, or a pylorectomy or partial gastrectomy may be performed, and, according to the position of the ulcer, a gastro-jejunostomy may or may not be done afterwards. All those methods have been carried out with more or less satisfactory results. But the one fact which comes out quite clearly is this: As soon as you begin to do anything other than gastro-jejunostomy on these patients—who are often already half-starved, and therefore not in condition to stand operation well—the mortality goes up tremendously. In his recent book on 'Diseases of the Stomach' Bassler has collected the results of operation for gastric ulcer by 14 surgeons, and the mortality recorded was 16·3 per cent.—the operations including gastro-jejunostomies, excisions, pylorectomies, resections and so on. The mortality associated with any other operation than gastro-jejunostomy is, therefore, considerable. Is it right to submit your patient to this much-increased risk and remove the ulcer in order to save him from the unknown risk of the subsequent development of cancer in the ulcer if not removed? I think not, except in regard to a very small number of the cases, but many surgeons think otherwise. If I do not think a case will be cured by gastro-jejunostomy, I consider that usually the right treatment is to perform jejunostomy and feed the patient temporarily directly into the jejunum.

Some of the reasons why I think jejunostomy is the better procedure are as follows:—A considerable proportion of cases of gastric ulcer heal as the result of the incomplete rest to the stomach which is obtained by medical treatment; one may therefore argue that as a result of the absolutely complete rest given by jejunostomy, a much greater proportion will heal. Further, the operation of jejunostomy is a slight one; I do not think it is attended with nearly so much risk as is even gastro-jejunostomy, and, of course, far less risk than excision or any of the more extensive operations on the stomach. Again, if it is properly performed, it does not cause much inconvenience to the patient. Moreover, such inconvenience as there may be is temporary, because after 5 or 6 weeks the opening is allowed to close.

The following case illustrates some of these points: W. S—, a male, æt. 54 years, was admitted on December 6th, 1917. Four months ago he began to have pain in the epigastric region immediately after taking food. This soon became severe, but was relieved for a time by careful dieting. The relief, however, was of short duration, and he had to give up one article of diet after another, so that during the fortnight preceding admission he had taken only diluted milk in small quantities at a time, and even this was now followed by severe pain. He had lost about 2 st., and on admission he was thin, but not emaciated. He had not vomited, nor even felt sick. Physical examination did not reveal much, but there was definite tenderness in the epigastric region in the mid-line and a little to the left of it. The X-ray investigation after a bismuth meal revealed hypertonicity of the stomach, but no other abnormality.

Clearly this was an instance of failure of medical treatment, because, in spite of being given nothing but diluted milk, he was still having severe pain. On December 13th I opened his abdomen and found a large ulcer, situated on the back of the fundus of the stomach. It felt to be about the size of a half-crown, and was firmly attached posteriorly. Now this patient was very weak; he had been starved for a long time, and clearly it would have been a very serious proposition to have proceeded to excise the ulcer. Therefore I performed jejunostomy. We began to feed him through the jejunostomy opening the next day with small quantities of peptonised milk at first, gradually increasing until he could take, without discomfort, 12 oz. of food at a time. In his food he had 3 eggs during 24 hours. At Dr. Fawcett's suggestion he was given some lime-water to drink, and also bicarbonate of soda after his feeds, so as to neutralise the gastric juice which was probably secreted at the time of feeding into the jejunum. He was fed entirely by the jejunostomy for 5 weeks, and then was given a little food by the mouth and less by the jejunum, until after 6½ weeks the jejunum was allowed to close, and he was fed entirely by the mouth. The weight-chart during this time was very interesting. His weight remained fairly constant all the time he was being fed by the jejunum—between 8 st. 1 lb. and 8 st. 2 lb. But within a week of commencing food by the mouth his weight went up 4 lb., in the second week 5 lb., and in the third week 6 lb. So it is clear that although this operation may rest the stomach, the nutrition of the patient is not altogether satisfactory although plenty of food was given and apparently absorbed.

He was discharged in good health and free from pain or tenderness on February 22nd, 1918, his weight being 9 st. 3 lb. From the time of the operation he never experienced his old pain. When last seen he looked the picture of health, and said he was in perfect health, and, in his clothes, he weighs 11½ st., so that, allowing half a stone for the weight of his clothes, he had increased since the operation from 8 st. 2 lb. to 11 st.

The following case comes under the third indication for operation—*bleeding*. For some months a gentleman, æt. 42 years had suffered from pain one or two hours after taking food, but had had no special treatment. Suddenly, on May 3rd, 1918, he had a serious hæmorrhage and fainted. He brought up a quantity of blood and subsequently had melæna, and he was laid up in consequence for some considerable time. He then apparently recovered except for some indigestion. But on August 21st he had a second severe hæmorrhage. He subsequently came under my care at the beginning of October. He was still very blanched, so his fæces were tested and occult blood found on two occasions. There was thus little doubt that his ulcer was still bleeding. I opened his abdomen, and found an ulcer which was causing some contraction of the pylorus. It was much indurated, and was situated immediately to the left of the pylorus. I did a posterior gastro-jejunostomy, from which he rapidly recovered. I received a letter from his doctor a few days ago saying that he is looking and feeling perfectly well, and is a much better colour.

This case well illustrates the accepted practice in regard to the treatment of a gastric ulcer which bleeds, except that after such a severe hæmorrhage as this patient had in May it was not necessary to wait for a second hæmorrhage before advising operation, although it is true that an ulcer may heal after one attack of hæmorrhage and give no further trouble.

Some years ago it was the practice of some surgeons to operate on these patients while bleeding was going on with the object of stopping the hæmorrhage, but as nearly all the patients died this is now seldom done. On the other hand, if, as in the above case, the patient is put to bed, kept perfectly quiet, given some morphia, and perhaps a little iced water to drink, he will almost certainly recover from the hæmorrhage. Now if such a patient has recovered from one or more severe hæmorrhages or has had a large number of small hæmorrhages, or is pale because of hæmorrhage, which shows itself in the form of occult blood on examination of the fæces, there is a definite indication for operative interference.

(4) *Contraction.*—If there is evidence that a gastric ulcer is causing contraction you have the clearest indication for operation. If there are symptoms of stomach dilatation, a succussion splash some hours after a meal, possibly visible peristalsis, and examination by X rays after a bismuth meal shows that a considerable proportion is left in the stomach after an interval of 6 hours, that is evidence

of contraction of the pylorus, which is almost certain to be progressive, and which no amount of medical treatment can alter. Moreover, this is the condition in which, as one would expect, gastro-jejunostomy is attended with by far the best results—in fact, it is nearly always perfectly successful, and the rapidity with which recovery takes place is often striking. Here are two cases of the kind:

The first patient was a man, æt. 49 years, who had had indigestion, more or less, for many years. During bad attacks he also frequently vomited. Pain was brought on by food, and usually came on an hour to an hour and a-half afterwards. In February, 1918, he brought up some blood, and was in bed for a fortnight. On examination his stomach was found considerably increased in size, and there was a marked splash, but no peristalsis was visible. He was able to take only fluids, but, in spite of that, every now and then he vomited considerable quantities. I had no doubt that he had a cicatrising ulcer, which was causing pyloric obstruction. I operated and found a large ulcer of the lesser curvature, close to the pylorus, causing much obstruction, for which I did a posterior gastro-jejunostomy. I have heard recently that he has done perfectly well and is in better health than for many years.

A man, æt. 33 years, had been invalided out of the Army on account of indigestion. This he had had for many years, but while in France he had become much worse than before. When I saw him he was having a good deal of pain in the epigastric region, which was usually worst during the night, so that his sleep was much disturbed. Vomiting was not frequent, occurring only once every 2 or 3 weeks, when he brought up a large quantity of fluid, with much temporary relief. He looked thin and ill, and examination pointed to a dilated stomach. This the X-ray examination confirmed, a considerable proportion of the bismuth meal remaining in the stomach after 9 hours.

At the operation the pylorus was found much contracted by a cicatrising ulcer, and posterior gastro-jejunostomy was performed. In a letter written two months after the operation he said he had had no further pain, was perfectly well, and had gained half a stone in weight in the last fortnight.

RECURRING ATTACKS OF DYSPEPSIA SYMPTOMATIC OF PARTIAL PYLORIC OBSTRUCTION.

By A. ERNEST MAYLARD, B.S., M.B.Lond., F.R.S.E., F.R.F.P.&S.Glas.,
Surgeon to the Victoria Infirmary, Glasgow.

WHAT I wish to be understood, by the heading of the subject to be discussed, is that there is a class of cases where indigestion in some form manifests itself, every now and again, unaccounted for by any other concomitant complaint—in other words, that the patient is in all respects perfectly well during the periods between the attacks of dyspepsia. Indeed, during the intervals of apparently normal digestion, he takes and enjoys the same food that is being consumed by other healthy members of the family. Perhaps I cannot do better, before discussing the subject further, than give the history of a fairly typical case.

S. J—, æt. 66 years, was admitted to the Victoria Infirmary under my care in September, 1918. His complaint was that for 3 years he had been suffering off and on from attacks of pain coming on about half an hour after food which were relieved by vomiting. He did not know of any previous attack of acute indigestion, nor had he ever seen blood in his vomit or in his stools. His appetite was good; and for his years, as a labouring man, he appeared well-nourished and vigorous. During the preceding winter his stomach had been much better; and it was only about 3 months back that his dyspeptic symptoms had become troublesome again. After admission to the infirmary he was put on light diet, and kept at rest in bed. He was given a good test dinner of chop, rice, and currants. Six-and-a-half hours after this meal his stomach was washed out: only a few grains of rice returned. On succussion slight evidences of "splashing" were made out; but palpation of the abdomen was free from pain, and detected nothing. He so much improved after a few days' hospital *régime*, that, considering his age and that his arteries were not particularly good, it was not deemed sufficiently imperative or expedient to perform any operation. So he was dismissed from the Infirmary with the injunction to return if his stomach again caused him trouble.

Towards the end of February, 1919, he returned complaining of a recrudescence of his gastric symptoms represented by an increased frequency of his dyspeptic attacks—so frequent, indeed, that there was very little interval between them. Heartburn, flatulence, and pain in the epigastric region were the dyspeptic symptoms he chiefly complained of. Operation being decided upon, the abdomen was opened, and a well-marked narrowing of the pyloric aperture was found, due to a small healed ulcer on the posterior surface of the pylorus. The aperture was not much larger than would admit an ordinary lead pencil. Owing to the want of mobility of the first part of the duodenum and the shortness of the transverse meso-colon, the jejunum was brought over the colon, and an interior gastro-jejunostomy performed. His chronic bronchitis troubled him somewhat after the operation, otherwise he made a good recovery, and was relieved of all his old troublesome and persistent dyspeptic attacks.

Viewing the case from what was revealed at the operation, there can be but little doubt that a small chronic ulcer existed at one time in the region of the pyloric aperture; that this did not at the time of its activity give rise to any prominent symptoms—at least symptoms of such a pronounced character that a labouring man would allow himself to take count of. When, however, the process of healing had led to a narrowing of the outlet from the stomach, the viscus began to find difficulty in discharging its contents; and then commenced those symptoms, the persistency and frequency of which led him to seek relief at the infirmary; for he had come to learn that "bottles" and dieting, while they gave relief for a time, were only transitory in their beneficial influence, and he was soon as bad as ever again.

The three particular points I wish to bring out, and which the narration of the foregoing case, to a certain extent, serves to exemplify are: (1) The initial cause of the dyspeptic symptoms, (2) the character and peculiar intermittence of the symptoms; and (3) the only possible treatment.

(1) The Initial Cause of the Dyspeptic Symptoms.

In many of the cases embraced in the class under discussion an early history of an acute gastric attack, although, perhaps, some years previous, is obtainable—an attack which may at the time have been correctly diagnosed as due to a gastric or duodenal ulcer. Under careful treatment, dietetically and medicinally, the symptoms all subsided, and for years no gastric disturbances may have been experienced. The natural and correct inference is that the ulcer healed, and having been checked in its progress led, at the the time, neither to serious hæmorrhage nor to perforation. But there is another class of cases where the history of no such early crisis is forthcoming. There is absolutely no difference in the symptoms which the two classes subsequently manifest; it is only that in the one there is an antecedent record of possible ulceration, while in the other no such history of a previous illness is obtainable. The cause in this latter class is an undue narrowing of the pyloric aperture following upon a defective developmental process. Perhaps it is hardly right to speak of it as a defective process any more than one would speak of the narrowness of the oral orifice or of the palpebral fissure as defects. All apertures and canals in the body vary in calibre. The urethral meatus varies in diameter. The canal of the uterine cervix may be unduly constricted. The ileo-cæcal valve differs in width in different individuals. There is, indeed, no fixed standard by which it follows that all passages of any particular region or structure are of a uniform calibre. So it not infrequently happens that the pyloric aperture is unduly narrow, and in consequence, therefore, it may prove obstructive to the free conveyance of the gastric contents from the stomach to the duodenum. We may therefore ascribe two primary causes for the symptoms in the class of cases under discussion—cicatrisation after ulceration, and congenital narrowness of the pyloric aperture.

(2) The Character and Peculiar Intermittence of the Symptoms of Partial Pyloric Obstruction.

One very striking feature about nearly all these patients is that, barring the general impairment of bodily vigour directly traceable to the dyspeptic attacks, they are in all other respects in the enjoyment of good health. It is by no means an uncommon experience to hear these patients say: "If you will only put my stomach right I shall be all right." This statement really implies that their

appetite is good, that they have a relish for their food, and when their "attacks" are not troubling them they can take ordinary diet, and feel quite well. What annoys them is that every now and again, and not infrequently in the early stages at definite intervals of time, which may be weeks or months, they are seized with pain coming on at variable intervals of time after ingestion. They further notice that any undue indiscretion in diet, or anything that is likely to reduce their general body-strength, such as worry or overwork, conduces to the onset of an "attack." On the other hand, they find that a little careful attention to diet, coupled, it may be, with rest and the taking of a holiday, restores them to good health again and the ability to enjoy ordinary diet. Now the explanation of all these digestive vagaries is very simple and very suggestive. But before giving the explanation, the following case so graphically represents what has just been said that its narration will serve still further to emphasise and enforce the truth of these statements. I received a letter from a doctor in the country stating that he had a man under his care, æt. 30 years, who was seized periodically with attacks of epigastric pain, occurring every few months, but varying in severity and duration, lasting from 2 or 3 to 10 days at a time. These attacks had been more recently coming on at gradually lessening intervals. His doctor said that he had reason to believe that the symptoms were gastric in origin, for he had been able to elicit evidences of dilatation of the stomach. He asked me to take him under my care. Owing to there being no vacant beds in my ward at the time some weeks elapsed before he was written for. It was then ascertained that he had gone for a holiday. Later, I received a second letter from his doctor saying that the patient had returned from his holiday, and that he had so greatly improved as to be free entirely of all gastric symptoms. His doctor asked me, in the light of that report, what was my opinion of his case, and what would I now advise. I based my reply on experience I had already derived from the past histories of cases of partial pyloric obstruction: that if the patient were suffering from such a condition he would, as soon as he returned to his ordinary mode of living and customary work, have a recurrence of his symptoms. It was not long after that that I again received a letter from his doctor saying that the man had a return of all his old symptoms. He was accordingly admitted to the infirmary. His condition on admission was that of a man in good health; he was well nourished, and had no complaint except occasional attacks of severe epigastric pain. Physical examination of the abdomen revealed some tenderness of the skin and resistance to pressure in the epigastric region, but there were no evidences of gastric dilatation. If careful with his food he did not suffer any discomfort. In going into the history of his case it was ascertained that his illness commenced about 3 years previously, and at that time his doctor believed him to be suffering from duodenal ulcer. He was operated upon, and a well-marked cicatricial constriction of the pyloric aperture revealed. Gastro-jejunostomy was performed and the patient made a complete recovery, being permanently relieved of all his old gastric symptoms.*

In considering the functions of the stomach, we have to remember that one of its chief duties is to propel its contents, after a certain period occupied in the process of digestion, into the duodenum. That is to say, the involuntary muscle-tissue which forms so great a portion of the parietes of the viscus has, in common with all similar structures elsewhere, to contract, and the power of contraction is dependent upon conditions which may enfeeble or strengthen it. Over-exertion may exhaust the power of gastric contraction just as excessive work may inhibit prolonged acting of muscles in any other part of the body, be they voluntary or involuntary. So we may take it that a patient's symptoms of dyspepsia, or his "attacks" as he usually designates them, become manifest as soon as the stomach begins to fail in its power to drive its contents through the narrowed aperture. It can now be clearly understood why there should be such intermittency and such variableness in the symptoms, because all depends upon what the stomach can do to get rid of its ingesta. If from any cause, such as indiscretion in diet, overwork, etc., the tone and contractile power of the gastric muscle is reduced, then symptoms appear: food is unduly retained so that it ferments, causes gas and

* This case is extracted from my work, 'Practice and Problem in Abdominal Surgery,' p. 152, where other illustrations are given, and where will also be found a fuller description of the subject of "Congenital Narrowness of the Pyloric Aperture," p. 142.

flatulency with sour eructations; as soon as tone is restored these symptoms disappear. It can also be equally well understood why at one time in these cases there are evidences of dilatation and splashing, while at other times no such evidences can be elicited. It is just this occasional disappearance of all symptoms, previously so well in evidence, that renders these cases so deceptive and so misleading—that so frequently conduces to the belief that a cure has been effected when, in reality, only temporary relief has been afforded. Occasional gastric lavage, light and simple diet, stomachic sedatives, rest, both mentally and physically, will in nearly all these cases ensure subsidence of symptoms; but as soon as these patients return to a natural mode of living, striving to do as others do, and as they themselves have in the past been accustomed to do, back come all their old dyspeptic symptoms; and, almost without exception, the intervals between the "attacks" become gradually less, until the patient, driven by despair and the almost continuous discomfort of his malady, seeks some form of permanent relief, although that relief can be afforded only by operation. Such a train of symptoms, then, as those just described, occurring in otherwise healthy people, may be regarded as pathognomonic of partial pyloric obstruction.

(3) Treatment of Partial Pyloric Obstruction.

Dealing with a solely mechanical cause, we may take it that only mechanical measures can be of any use in combating it. Fortunately, we have in the operations of gastro-duodenostomy and gastro-jejunostomy two methods of treating the obstruction as effective in their object as they are safe in their execution. Of the two operations I prefer the former, performed after the method of Finney. By enlarging the natural outlet from the stomach it preserves practically intact the normal propulsive function of the viscus, which is to drive the ingesta through the pyloric aperture. However, as regards results, gastro-jejunostomy by the posterior no-loop method seems equally as successful in meeting the requirements of the case. The almost immediate relief afforded by either of these operations is as striking as anything we meet with in our surgical work. To be able to take food as other people and without the fear of any pain or gastric discomfort is a relief so great and so appreciated that a patient once said to me, "If I had only known what the operation was going to do for me, I would have had it done half a dozen times."

GASTRIC ULCER IN CHRONIC INTESTINAL STASIS.

By JOHN C. JEFFERSON, F.R.C.S.,
Hon. Surgeon, Rochdale Infirmary.

The association of gastric ulcer with chronic intestinal stasis is explained by Sir A. W. Lane as follows: The delay in the passage of the intestinal contents begins, as a rule, in the pelvic colon, and spreads backwards, so that soon the outflow of the liquid content of the small intestine into the cæcum is also hindered. This may be brought about by accumulation of hard fæces in the large intestine, or by the fact that the cæcum is enlarged, distended, and twisted on its axis; by the presence of a "controlling" appendix, which, acting as an external band, obliterates the lumen of the gut; or lastly, by the presence of acquired adhesions, producing a kink in the terminal portion of the ileum. Any of these factors may be present alone or more usually several of them act together in a varying degree. Whatever the cause, the result is that the small bowel cannot properly empty its contents, and becomes overloaded and abnormally heavy.

In the erect posture the small intestine will therefore tend to sag even more than normally into the pelvis, and consequently a sharp kink arises at the duodeno-jejunal flexure. As a direct result the duodenum in its turn cannot properly empty itself, and becomes distended, so that at last the stomach becomes unable to evacuate its contents, and pathological changes arise in its mucous membrane, eventually leading to ulceration.

To these purely mechanical factors must be added the constitutional effects of the auto-intoxication of chronic intestinal stasis due to absorption of toxins from the gut. That such a condition can arise from a simple kinking of the lower portion of the small intestine is strikingly shown by the following case:

Mrs. W—, æt. 49 years, was referred to me as a case of gastric ulcer. She gave a history of "indigestion" for 20 years. At first the indigestion took the form of flatulence, coming on directly after meals, and accompanied by colicky pain in the right iliac fossa. Four years ago her

symptoms became worse. The pain became more intense, and she began to vomit. The pain commenced immediately after meals, and was relieved by the vomiting, which occurred, on an average, about an hour afterwards. She had, when I saw her, become a chronic invalid, was restricted almost entirely to liquid food, and was frequently forced to spend a few days in bed, by which she gained temporary relief. The pain was referred to the right iliac fossa, and now also to the upper segment of the right rectus. In the last year she had lost flesh rapidly, and constipation, from which she had always suffered, had become very marked, so that the bowels were opened only infrequently by large doses of aperients. A further interesting point was that she had never menstruated. She had no children.

On examination she was a sallow, dark-haired woman of the typical chronic intestinal stasis type. There was tenderness and rigidity on pressure over the upper segment of the right rectus and pain, but no rigidity, on palpation of the right iliac fossa.

Well-marked splashing sounds could be elicited from the stomach 3 hours after a small quantity of liquid food had been taken. The tongue was furred, and the temperature normal.

Radiographic examination showed active peristalsis and marked delay in emptying the stomach.

At operation a long right rectus incision revealed stenosis of the pyloric portion of the stomach due to ulceration. At some time the ulcer must have been in danger of perforation, for a portion of the omentum had become adherent in this region. The rest of the omentum was densely adherent about the tubes and ovaries in the pelvis. The duodenum appeared abnormally mobile and was distinctly dilated.

A posterior gastro-enterostomy of the usual type was performed. On examining the cæcum and large intestine they were found to be normal. The appendix, however, was in the pelvic position, and adherent, together with a mass of omentum, to the pelvic brim in the region of the right ovary. On freeing the adhesions and removing the appendix, the terminal portion of the ileum was found to reach the cæcum by taking a course almost directly upwards from the pelvis. This portion of the ileum was collapsed and pale in colour. On tracing it down it was found that it was adherent all the way to the floor of the right iliac fossa until it reached the region of the right ovary. Here it formed a sharp kink, after which it became free, but was distended and distinctly congested. This terminal portion of the ileum was freed with some difficulty and the resultant raw areas were obliterated as far as possible. It was thus left absolutely free. The ovaries were very small, about the size of peas, and the uterus small and acutely ante-reflexed, obviously of the "infantile" type.

The patient made an uninterrupted recovery. On returning to her history I tried to account for the adhesions found in the pelvis, but with no result, as she did not remember any serious illness except the present one. It was in my mind that possibly an attack of appendicitis in childhood or peritonitis of tuberculous or other origin might have been responsible. I could, however, elicit no history of such an occurrence. The relief she was accustomed to secure by rest in bed would be explained by the fact that in the recumbent position the drag of the overloaded small intestine would cease to be operative and the sharp kink at the duodeno-jejunal flexure would be straightened out Thus the stomach would be enabled to evacuate its contents more readily. Since, however, the kink in the ileum was permanent, the old condition recurred directly the erect posture was again assumed. The case shows the necessity of an absolutely thorough and systematic examination of all the viscera in every abdominal operation.

Vincent's Angina of the Penis.—Bond reports a case of ulcer at the muco-cutaneous junction of the foreskin, which rapidly spread with the formation of two more ulcers. There was marked œdema, the ulcers had a greyish, sloughing bottom, ragged, irregular, undercut edges, with a foul discharge. Glandular enlargement was not present. A smear from the exudate of this lesion, stained with Gram's stain, showed the fusiform bacillus, the thread-like organisms found in the so-called angina of Vincent, and the larger spirilla characteristic of the forms designated by Flügge as vibrios. The use of saliva as a lubricant for intercourse was admitted.—*Journ. Amer. Med. Assoc.*, p. 1492.

Physical Signs in Acute Pulmonary Inflammation.—Major R. D. Adams and Capt. C. M. Montgomery state that in America the recent epidemic of acute respiratory inflammation with frequent complicating pneumonia aroused new interest in physical signs associated with the latter. The common picture was that of a lobular pneumonia with tendency towards confluence in the dependent positions. Even in the severer types, however, consolidated patches were usually interspersed with small air-bearing areas. The lobes so involved were in great part firm and their size increased. An extensive unilateral involvement displaced the heart towards the less involved side, and sometimes pushed the liver downwards. In some instances bulging of intercostal spaces was observed—a phenomenon naturally associated with pleural effusion.

Taking for the sake of simplicity the case of a patch 8 cm. in diameter at the left scapular angle, the physical signs were: diminished vocal fremitus; slight percussion dulness; diminished intensity of breath-sounds with slightly prolonged expiration; clear, distinct, whispered pectoriloquy; the spoken voice diminished in intensity, the quality altered and pitch raised; and persistent, localised, fine-bubbling *râles*.

With confluence of lobular areas resulting in practically a lobar involvement, vocal fremitus was found frequently diminished; the percussion note impaired, often low-pitched tympany rather than dulness being elicited; breath-sounds suppressed or of a weak, broncho-vesicular or bronchial character; whispered pectoriloquy clear but not always loud; the spoken voice elevated in pitch, altered in quality, and the intensity exhibiting a wide variation, in some cases being diminished, in others intensified.

That diminished vocal fremitus and vocal resonance in the presence of dulness and whispered pectoriloquy have been a frequent observation in the absence of any pleural exudate was confirmed by ante-mortem roentgenoscopy and roentgenography and by necropsy. In necropsies early in the epidemic and later during its crest, pleural effusion was exceptional. With the ebbing tide, pleural complications with pus formation were frequent. Lack of anything approaching uniformity in physical signs in clear-cut uncomplicated pneumonias led the writers to depair of determining the onset of pleural effusion except by exploratory puncture. In other words, the physical signs of many confluent areas are apt to approach those of ordinary lobar pneumonia, in which the vocal fremitus and resonance are sometimes increased, at other times diminished. Variations from the typical picture seem to be accounted for by persisting areas of air-bearing lung, and also by the presence of a considerable amount of frothy moisture.

Vocal fremitus and vocal resonance of normal or diminished intensity, with bronchial breathing and whispered pectoriloquy such as frequently occurred in this epidemic (and as is commonly found in other forms of pulmonary consolidation, especially of an acute inflammatory type), have not often been described except in cases of fluid in the pleural cavity. Some of the confusion regarding the vocal resonance has resulted from a failure to recognise the difference between intensity of sound on the one hand and variations in quality and pitch on the other. When the spoken sounds become less muffled than in health, higher pitched, clearer, and closer to the ear, the auscultator must take care to keep these features distinct from that of simple loudness or intensity, which many fail to do. Austin Flint expressed this distinction, stating that "a concentrated, high-pitched sound, however feeble, is not less a sign of complete or considerable solidification of lung. In other words, intensity is not essential." And again, "increased intensity may cease when bronchophony occurs."

The frequent occurrence of normal or decreased vocal fremitus and resonance plus bronchial breathing and whispered pectoriloquy in cases of consolidation presents a striking contrast to the findings over the normal lung, where the vocal fremitus and resonance are normal in intensity and bronchial breathing and whispered pectoriloquy are absent. Thus sounds of different pitch are not affected similarly in solid and normal lungs. This cannot be explained by simple conduction. An important factor that has been slighted in the literature is the response of the membranous tissue of the normal lung to vibrations included within a certain range of pitch. Secondary vibrations are produced. In ordinary conduction sounds of all pitch are affected alike. This factor is alluded to by Austin Flint in contrasting the clear-cut sounds heard over a consolidated area with the muffled, humming quality of normal voice sounds, the latter modification being attributed to "secondary vibrations set up in the taut-drawn elastic fibres of the alveolar walls, which blur the distinctness of the original sound-waves."

In the comparatively simple case of the solid lung, sounds of varying pitch, having escaped from the bronchial tubes, pass to the surface of the lung and chest-wall, with no marked modification except that of diffusion, which acts alike on sounds of different pitch. While sounds of different pitch suffer diminution, they maintain to a great extent their relative degrees of intensity. The lower pitched sounds, such as those felt on palpation, arrive at the chest surface over a normal lung in a state of considerable intensity, being often more marked than vibrations over solid lung. The

higher pitched vibrations, however, such as occur in bronchial breathing and whispered pectoriloquy, are lost by the reflective action of the tense membranous tissues of the normal lung and the chest wall—factors entirely additional to diffusion. The lower pitched vibrations, on the other hand, initiate secondary vibrations in the membranous tissues of the normal lung, much as one vibrating tuning-fork may cause another tuning-fork of proper pitch to vibrate. The principle involved is different from that which is operative in simple conduction. These normal pulmonary membranes are of such tension and structure as to be set into secondary vibration chiefly by vibrations within a certain range of pitch. The solid lung, on the other hand, lacks both the special intensifying and deintensifying factors of the normal lung. Having chiefly the factor of diffusion, present also in the normal lung, to affect the vibrations passing through it, the solid lung allows the vibrations to reach the chest-wall well preserved, and at the same time exerts an equal effect on vibrations of different pitch.

Regarding fremitus, the hand can feel only vibrations of a low pitch. The normal lung favours the transmission of rather low-pitched vibrations, while the solid lung is favourable to simple conduction of sounds of all degrees of pitch. It is thus easy to see why a diminished vocal fremitus is sometimes associated with increased vocal resonance, and why voices of equal intensity but different pitch may yield different vibration intensities at the chest surface.

The association of whispered pectoriloquy with normal vocal resonance, frequently encountered over small areas of consolidation, is due to the size and location of these areas. Any modification of the spoken voice vibrations in these areas is lost to the ear because it is obscured by the vibrations coming from the surrounding normal lung, while the whispered vibrations encounter no such external interference.—*Journ. Amer. Med. Assoc.*, p. 987.

The Reactivation of Erythema Nodosum by Tuberculin.—Prof. A. Chauffard and M. L. Girard refer to the intimate relations between erythema nodosum and tuberculosis recognised in the last 15 years. What clinical experience suggested has been confirmed by pathological anatomy and by experimental pathology. Poncet first pointed out the connection between erythema nodosum and tuberculosis. Dor then observed a typical tuberculous follicle in an erythematous nodule. Finally Landouzy found a tubercle bacillus in an inflamed vessel in such a follicle. On the other hand, Prof. Chauffard and M. Troisier in 1909 produced nodules typical of erythema nodosum by intradermic injection of tuberculin, while control injections with normal saline solution, the typhoid toxin and antidiphtheritic serum were inactive. Chauffard and Girard have obtained a new proof of the tuberculous nature of erythema nodosum—the reactivation of the disease when nearly extinct by injection of tuberculin. Not only the nodule but all the phenomena of the disease—the fever, arthralgia and the evolutionary cycle—were reproduced :—

A married woman, æt. 31 years, was admitted into hospital on August 20th, 1918. At the age of 2 years she suffered from fracture of the spine and right femur, which were followed by kyphosis and an abscess and sinus in the neighbourhood of the trochanter. At 14 she had an attack of pains in the knees which lasted a fortnight. When the pains disappeared symmetrical erythematous nodules appeared on the legs. In 1914 and 1915 there was intermittent hæmoptysis.

On admission she had suffered for 3 days from fever and pains in the joints of the legs and right shoulder. The temperature was 101·8° F. The painful joints showed no changes. The lungs were emphysematous, and there was slight dulness at the right apex with sonorous and sibilant *râles*. Under salicylate treatment recovery took place in a few days, but a relapse began on August 25th. On the 28th the pains had disappeared and the general condition was good, but over the middle of the crest of each tibia two painful symmetrical patches of erythema nodosum appeared. On the following days the erythema disappeared. On August 31st one drop of a 1 in 1000 solution (in mistake for 1 in 10,000 solution) of the tuberculin of the Institute Pasteur was injected into the skin of the left arm. The reaction was positive; the temperature rose to 100·7°, and an erythematous painful nodule of the size of a cherry with all the characteristics of erythema nodosum was felt at the site of injection. On the following days it remained stationary, the temperature ranged from 101·3° to 103·1°, and the patient complained of pain in nearly all the large joints. On September 2nd the erythema nodosum of the legs, which was painless and retrogressing, became painful and seemed to be rekindled. On September 5th a crop of erythema nodosum, formed of patches of the size of a lentil, appeared around the initial elements over the crest of the tibia. Here the patches were somewhat confluent. There were others more apart on the legs, knees and anterior surface of the thighs. There were two on the face—on the right eyebrow and on the chin. On October the 6th and 9th there were fresh attacks of arthralgia. On the latter day the erythema was disappearing, but the nodule of the intradermic reaction persisted until the 29th. On September 18th there was arthritis of the right knee, which disappeared on the 20th. Thus the attack of erythema nodosum provoked by the tuberculin was more acute and more severe than the primary one.—*Bulletins de l'Académie de Méd.*, p. 182.

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HÆMATOGENOUS (IDIOPATHIC) PERITONITIS.

By W. H. BATTLE, F.R.C.S.,
Consulting Surgeon to St. Thomas's Hospital, etc.

IN every large hospital cases are admitted from time to time in which there is unusual difficulty in coming to a conclusion as regards the causation of the peritoneal inflammation which is evidently present. Many of these, in fact most of them, are cleared up by the operation which is performed, at which a definite lesion is found which accounts fully for the peritonitis. In others the examination of a culture taken from the peritoneal exudate reveals the presence of a bacillus which is not usually present amongst the other germs which are common in inflammations of this part of the abdomen. Occasionally nothing is found at the operation to account for the attack, the fluid or exudation submitted to the bacteriologist is reported as sterile, and if the patient dies no lesion may be found to account for the illness when the abdomen is searched at a full and careful necropsy.

Of the various germs which apparently obtain entrance by the blood-stream and produce a generalised peritonitis, the pneumococcus is probably the best known. There is a strong probability that this germ can enter the peritoneum by passing inwards along the Fallopian tubes, and some of the patients have been suffering from a vaginal discharge at the time of the onset of the peritonitis. Yet although it is more common in females, it is also met with in males. We can also add that in some of the cases with vaginal discharge the Fallopian tubes did not appear to be inflamed even when examined after resection, excepting on the surface, where they were affected like other peritoneal structures around.

Sir H. Rolleston, quoting Benda's statistics ('System of Medicine,' Osler and McCrae, vol. iii, p. 673), gives the relative importance of the various starting-points of general peritonitis in 446 cases: Diseases of the appendix 115, stomach and duodenum 68, the rest of the intestine 118, the female genital organs 81, gall-bladder 10, kidney and urinary bladder 10, pancreas 2, spleen 1, post-operative 4, unknown origin 35, hæmatogenous 2. Taking into consideration more recent statistics it is probable that the effect of diseases of the appendix is much under-estimated, whilst that of the other parts of the digestive tract is placed at too high a figure.

It is far from easy to give any very dogmatic statements of value as to the relative occurrence of the different germs in "idiopathic" or hæmatogenous peritonitis. For one thing it is difficult to produce a list of cases ticketed in their order as due to such and such a germ, for operations performed on acute cases are frequently done at night, and are possibly somewhat hurried so that the specimen is lost. (This statement applies chiefly to the recent strenuous period of the war). Further, when examined in an early stage the exudation may be sterile!

In looking through the records of St. Thomas's Hospital for the years 1909–1918 inclusive there is found a series of 78 cases which come under the heading of peritonitis of unknown origin—or at least did so until the bacteriologist had made his report, or a lesion was discovered as a result of a necropsy. Sometimes the case remained obscure because nothing was revealed by either method of examination. Of these 16 occurred in males and 62 in females. They were as follows: Due to the pneumococcus, 31; the *Streptococcus pyogenes*, 18; the *Bacillus coli*, 1; *Bacillus pyocyaneus*, 1; the gonococcus, 1; whilst in the remainder, 26 in number, the origin remained doubtful, although there was a strong suspicion that some of them were due to the pneumococcus.

To take the most common of these, that due to the pneumococcus, it is as a rule not difficult to differentiate this form from the peritonitis which follows a gross lesion of the digestive canal, unless the signs of inflammation are localised or most marked in the right iliac fossa when the disease first appears. In pneumococcic peritonitis signs of inflammation may be first manifest in one or other iliac fossa, or simply begin as a generalised infection, not localised to any part. Barling divides this variety of peritonitis into three types: (1) Acute cases presenting marked abdominal symptoms from the first, but with no other pneumococcal lesions elsewhere; (2) cases in which simultaneously, or almost so, with the onset of peritonitis a pneumonia develops; (3) chronic septicæmic cases.

Of the cases of pneumococcic peritonitis (all acute), 9 recovered and 22 died.

The following account is a good clinical description of such a case and a record of its progress. It shows that success may be obtained even when any treatment appears almost hopeless.

The patient, D. G—, a little girl, æt. 10 years, was admitted under the care of Dr. C. R. Box with a twenty-four hours' history of abdominal pain, vomiting and diarrhœa. There was no history of previous attacks of abdominal pain, and the child appeared well until the evening before, when she complained of pain in the lower part of the abdomen and soon afterwards began to vomit. The pain recurred at intervals until admission, each attack being accompanied by the vomiting of some yellow fluid. There had been 5 or 6 loose actions of the bowel. She had not had any cough.

The House-Physician, Dr. Hibbert, made a note to the following effect: On admission the face had a rather dusky flush, the eyes were bright, and the expression of the face serious but not anxious. The alæ nasi were working rapidly but there was no grunting. The tongue was white and furred. Pulse 156, respirations 40, temperature 103° F. The abdomen was somewhat flattened in the lower part and moved poorly with respiration. There was diffuse tenderness all over it, but especially in the right lower quadrant, where the rectus was slightly more rigid than on the left side. There was no tenderness or dulness in the loins. Peristalsis could be seen and gurglings heard over the abdomen. The liver-dulness was normal. Movement of the right chest was diminished. The percussion note was everywhere resonant, vocal resonance and vocal fremitus normally conducted. The breath-sounds were harsh and puerile on the left side and considerably diminished at the right base. No moist sounds. There was no vaginal discharge. The urine, sp. gr. 1024, acid, a cloud of albumen present on boiling.

The temperature remained high and the pulse-rate unaltered during the night and she vomited occasionally. There was considerable complaint of pain, which was only partly relieved by hot fomentations to the abdomen. It was necessary to pass a catheter in the morning. A rectal examination showed tenderness and œdema on the right side of the pelvis. Dr. Box, who now saw the patient for the first time, asked me to see her with a view to operation.

At this time, 12 o'clock, her general condition was much as on admission—temperature 103° F., pulse 136, respirations 42—but there were no signs of lung inflammation. There were, however, some changes in the state of the abdomen. It was still without distension but the tenderness was more general, and percussion showed the presence of a considerable amount of fluid in the flanks and across the pubes. Movement was poor.

Under the influence of a general anæsthetic the abdomen was opened by an incision in the appendix region with displacement of the rectus muscle inwards. There was nothing noteworthy until the subperitoneal tissue was reached: this was somewhat œdematous. A thin fluid escaped when the peritoneum was opened and there was a considerable quantity of this in the pelvis and right side of the abdomen. It was without odour, contained many flakes of lymph but there was little appearance of pus. The intestines were injected and red, and the appendix shared in these signs of inflammation but was not affected beyond this. It was about 3 in. long, not adherent or in any way obviously diseased when examined after removal, but it is interesting to note that it contained several bristles, probably derived from a tooth-brush. The pelvic organs were normal. There was no attempt at the formation of adhesions anywhere, and the omentum was not gathered in the iliac region. The greater part of the fluid was removed with gauze plugs, which were passed into the pelvis and right side of the abdomen and allowed to soak it up. A drainage-tube was put to the bottom of Douglas's pouch and the wound closed in layers up to it.

That evening the temperature had come down to 101·5° F., and pulse 120. She said that she felt better, but was suffering from a dry, furred tongue and great thirst and was occasionally delirious.

On the following day there was a large quantity of brownish discharge in the dressings. General condition much the same; abdominal rigidity rather less. On the third day after operation she was feeling better. Temperature 101° F., pulse 100, respirations grunting and shallow. The chest appeared to be tender all over. Posteriorly the percussion note was dull from the ninth rib downwards on both sides. The note was elsewhere resonant. The breath-sounds were absent over this area, the transition being very marked. Vocal resonance was much diminished over the right side between the scapula and vertebræ.

The report on examination of fluid removed from the peritoneum at the time of operation was received from the clinical laboratory: it contained the pneumococcus.

On the fourth day the discharge from the tube had almost ceased, so it was removed. Pulse 120, respirations 26, temperature 100° F. She had developed a cough.

On the fifth day she was often sick and could not keep down much milk. Saline was being given by rectum. The abdominal wall was generally tender and rigid; she complained of much pain and a constant, trying cough. A stock vaccine of 9,000,000 pneumococci was given.

On the sixth day the breath-sounds over the dull area at the right base were of a blowing character. Pulse 156, respirations 56. Patient had diarrhœa. The abdomen was much as on the previous day, but was rather more rigid.

On the seventh day she was feeling better. The pulse was 116, respirations 40, and temperature 99·4° F. The diarrhœa was much less.

On the eighth day this improvement continued, with scarcely any tenderness or rigidity, whilst there was more discharge from the wound. The lung signs continued much the same.

On the ninth day there was much increase in the amount of discharge, which was of a yellow colour and without odour, but the abdomen was more rigid and tender than it had been. She was still very thirsty. Breath-sounds tubular over the dull area, with a tendency to moist crepitations. The tongue was quite clean.

On the tenth day another dose of 9,000,000 pneumococci was given, and the result appeared to be better than that which resulted from the last injection of stock vaccine, for the following day the

patient was improved, with lower pulse-rate, temperature and respiration. She said she was feeling better, had had some fish, and expressed her willingness to eat some chicken. There was still a good deal of discharge, but the abdominal tenderness was less, as also the rigidity of the abdominal wall. The improved condition was preceded by an attack of looseness of the bowels.

The patient left the hospital after a stay of 6 weeks for a convalescent home. The condition of the lungs was very slow in resolving, and 3 weeks after admission the right side of the chest was explored to exclude empyema, as there was a persisting area of dulness. No pus was found, but the result was a temporary improvement in the temperature. At the same time the abdominal wound was repaired and sutured, but the stitches gave and discharge continued until almost the last day, even when she left hospital there was still dulness at the right base. The temperature for this month continued to be somewhat irregular, varying from 99° and 98° F. in the morning to an average of 101° F. in the evening.

Injections of autogenous vaccine were given on the eighteenth (12 millions), twenty-first (12 millions), and twenty-seventh (12 millions) days after operation, but the improvement effected was not marked. It appeared that the temperature fell in a few hours and the pulse-rate lessened for a time, but even on the day she left the hospital it was over 100. The abdominal symptoms subsided slowly; the discharge was prolonged and at first profuse, it continued for nearly a month, and ceased reluctantly, whilst there was a complaint of tenderness on examination until nearly the end of her stay with us.

She was seen again some months later in good health, excepting for a weakness in the abdominal wall, which was repaired by operation. This was at the site of the passage of the tube used for drainage.

Barling gives the relative percentage according to sex in pneumococcic peritonitis as 73 per cent. females, but in the 31 from St. Thomas's no less than 28 were females. The average age of 26 of them was under 10 years, whilst of the whole number the average age of those who recovered was higher than that of the fatal cases. In some there was a history of previous and fairly recent chest trouble, but in others the child was suddenly taken ill with acute abdominal pain (one girl was suddenly awakened from sleep by the pain). This was commonly accompanied or quickly followed by vomiting and diarrhœa. Examination of the abdomen showed in the early stages a want of movement during respiration, a rigidity of the muscular wall and tenderness. To this were added, as the case progressed, dulness in the flanks, which after a time changed according to position, and distension. Even in the early stages the child is evidently seriously ill, the pulse is rapid, the respiration hurried, and the temperature raised, whilst the face of the patient, which is at first flushed, becomes later dull and listless, with sunken eyes. It will have been observed in the record given above of a case, that on rectal examination a boggy feeling was found, especially on the right side of the pelvis. A similar observation was made by Mr. H. B. Robinson in a case described by him in the 'British Medical Journal' (vol. i, 1909, p. 65). But in neither instance was any disease of the tube found at the operation, and the appendix was normal.

Dr. Hector Cameron is against operation excepting in residual abscess. I can but think that the mortality in the series of cases at St. Thomas's would have been very much higher had they not been subjected to operation. Sometimes the operation was delayed because of a pulmonary complication, but improvement was mostly quickly seen after incision with provision for drainage. The surgeon will, however, be guided by the duration and extent of the mischief. In one instance treated in my wards, success followed incision, cleansing of the lower part of the abdomen, and close suture without drainage. Here the woman, æt. 20 years, had been admitted with sudden fever, abdominal symptoms of one day's duration, temperature 101° F., pulse 120, respirations 28. Amongst other signs there was localised thrill from fluid and dulness in the right side over the appendix region, where she had great tenderness. This fluid was straw-coloured (with flakes of lymph), as it generally is, but sometimes it is described as yellowish-green. It is without smell, and in the later stages becomes definitely purulent.

In a girl, æt. 17 years, there was a history of earache without discharge.

In the fatal cases diarrhœa was a common symptom, and a distended, almost immovable abdo-

men even with a short history, but in one, a child of 4 years, it was described as soft, not particularly tender, and without dulness, excepting in the right side. Still there was pale greenish, purulent fluid with lymph in the peritoneum, and the child died on the fourth day after operation. When operations were performed late in the fatal cases it was because they did not come to the hospital sooner. In two instances the children were almost moribund, and in one of them there was no improvement permitting operation. In more than half there was a pulmonary complication. Two patients were transferred from fever hospitals, having been sent there for supposed enteric.

In some the condition was one of intense toxæmia, and it is very doubtful if earlier operation would have proved of much value beyond making the child more comfortable by the relief of pain. Still, in more than one instance operation appeared very helpful. In some instances of great distension of the abdomen with much pus secondary to a diseased appendix, incision under local anæsthesia with the insertion of a tube for drainage will give the patient the best chance of life. In hæmatogenous peritonitis rather more is required, but efforts must be made to avoid anything like injury of the peritoneum from too much manipulation, and excess fluid may be gently wiped away with soft moist strips of gauze. The value of intra-spinal anæsthesia should be remembered.

In the series of 78 cases mentioned above there were 18 of infection of the peritoneum by the *Streptococcus pyogenes*—2 males and 16 females. Of these, 6 females recovered, the other sdied. Eleven of them were under 10 years of age; three were over 20 years of age.

There is very little to be found in our literature which enables us to speak with authority about this form of peritonitis. Sir H. D. Rolleston writes of this form: "The *Streptococcus pyogenes* gives rise to the most acute and fatal peritonitis, and it is doubtful if any surgical procedure offers a prospect of success."*

Operation has therefore fully justified itself as regards this form of peritonitis also, for a third of the cases where the streptococcus was found were saved.

I have published some examples of this form of peritonitis already and need not take up time by a repetition.* One was a case of acute mischief in a woman, æt. 60 years, treated by incision and drainage. A secondary abscess formed in the buttock, the pus in which contained the same germ. Vaccine proved useful after operation. In this case some days after the commencement of symptoms the fluid, not evidently localised, was without smell, contained flakes of lymph, but was otherwise clean. It has, however, varied in character in other cases: sometimes it was abundant, at other times scanty; sometimes clear, at other times a thick purulent collection without definite boundaries; once it was a thick, dirty-greenish colour. In many of the fatal cases it was evidently part of a general septicæmia, and post mortem pus was found in several parts, especially in the pleuræ. Mostly the germ was typical streptococcus, but in others it was described as atypical; no difference was apparent in the malignancy of its character. In one of the few in which a cause for the infection was found (a three weeks' suppurating bubo) the *Streptococcus fæcalis* (Andrew's) was present.

In one small child there was a vaginal discharge.

Little need be said here about the *B. pyocyaneus*, which was found in a woman, æt. 30 years. She came to hospital with a history of 5 weeks' illness, with general enlargement of the abdomen, pleurisy and pneumonia. She had been sent to a fever hospital as suffering from enteric and soon transferred. There was a good deal of fluid in the abdomen, but more than a local puncture with insertion of a tube could not be attempted. This infection is described as very malignant.

In one child with a gonococcus infection there was a vaginal discharge.

The case of *B. coli* infection probably depended on some lesion of the appendix which was not recognised.

There is still a somewhat large and very interesting group in which the cause remains doubtful. These number 11 males and 15 females, only 5 of which were under 10 years of age. Beyond the fact that in the majority of the fatal cases the illness had been in progress for a longer time (4 being practically moribund) there was little to account for the difference in result. In one pneumonia, in a second pleurisy and in a

* 'System of Medicine,' Osler and McCrae, vol. iii, p. 690.

* 'The Acute Abdomen,' 2nd edit., p. 93.

third endocarditis were found at the post-mortem, but in most nothing more than a general intense infection of the peritoneum. Often the fluid was sterile at operation!

When reading the notes of these cases one can but say regretfully, as so often in acute abdominal conditions, "Too late." Early operation might have saved several of them.

(Cases of operation in this group are described in 'The Acute Abdomen,' 2nd edit., Battle, p. 89.)

In none of the cases under consideration could it be said that the case was one of localised mischief, for where there was a marked collection of clear fluid (possibly sterile) it had no definite boundary. In others where there was a purulent collection it was mostly a pocketing from an extensive affection of the peritoneum and the disease was not truly localised. In tabulating these cases one has endeavoured to thoroughly exclude the local residual abscess, comparatively few of which appear in the hospital statistical statement for the years selected.

It is probable that at the present day, when operation in acute peritonitis is the wise rule of the surgeon, we shall obtain better results than in the past. There should be no "wait and see" about the treatment of these cases. The patient must be made as safe as possible, the effusion into the peritoneum already present gently cleared away, and the further accumulation and absorption of toxic fluid prevented for the time and provision made to forestall accumulations during the following days whilst the patient's powers of resistance are rallying. As it is not possible to say definitely what the cause is in every case, and so many instances of peritoneal inflammation prove fatal if left, there is little excuse for delay. It is true that in some cases the inflammation might become localised, but even then there is a danger that treatment may be too late. It is admitted that pneumonia may develop as part of the infection, but it does not follow that it will do so, nor in cases where it is already commencing is it certain to prove fatal. Surely the lessening of the amount of re-absorption from the peritoneum should help in the fight against the toxæmia, which is so dangerous. The operation of the present day need not add to the inspiratory embarrassment if spinal anæsthesia is employed.

INTERNAL DERANGEMENT OF THE KNEE.

By Sir C. GORDON WATSON, K.B.E., C.M.G., F.R.C.S.,

Assistant Surgeon to St. Bartholomew's Hospital.

So long ago as 1803 Hey of Leeds described cases of mechanical impairment of the knee-joint under the title of "internal derangement"—a title which conveys the idea of a "hampered lock," or, "a gate with a stone in its hinge." We now know that in the great majority of these cases the derangement results from injury to one of the semilunar cartilages and most frequently to injury of the internal cartilage, although in some instances a somewhat similar group of symptoms result from the presence of loose bodies or hypertrophied synovial fringes in the joint.

Injury to the Semilunar Cartilages.

Pathology.—The mechanical factors which produce a rupture of a semilunar cartilage are the subject of some dispute. *Experimental* evidence seems to point to the actual tear taking place during the final stage of extension, when the femur is screwed home on the tibia and the limb is fixed in extension. *Clinical* evidence goes to show that injury is brought about when the leg is partially *flexed*, *abducted*, and *rotated outwards*. Although at first sight experimental and clinical evidence seem contradictory, it is probable that the accident results from a combination of these two factors. During flexion the tibia glides in company with the cartilages on the condyles' and in the flexed or semi-flexed position some rotation between the two bones becomes possible. When the tibia is rotated on the femur the cartilages, owing to their shape, cling to the condyles and remain in contact with them so that the tibia moves to some extent on the under-surface of the cartilages. The tendency of external rotation of the leg on the thigh is thus to draw the anterior portion of the internal semilunar cartilage across the condyle of the femur, *i. e.* towards the centre of the articular facet on the tibia. At the same time, during flexion of the leg, the cartilage is sliding backwards on the articular surface of the internal condyle. If, while the leg is undergoing flexion

and rotation outwards, the tibia is forcibly abducted from the femur so that the internal lateral ligament is put on the stretch, it becomes possible for the anterior portion of the cartilage, owing to its elasticity, to be drawn into the gap between the apex of the condyle and the tibia. Should this occur and the cartilage become nipped between the bones, it is obvious that not only will the ligaments be forcibly stretched and severe pain result, but also that the normal gliding movements of the two bones on one another will be checked. The sudden check combined with sudden sharp onset of pain will tend to throw the patient down, and in the effort to save a fall the quadriceps will be put into sudden and violent contraction. If it is remembered that the lateral expansion of the vastus internus is loosely attached to the margin of the anterior third of the internal cartilage and that the internal lateral ligament is firmly attached to the middle third, it can readily be seen that there will be a tendency in the sudden act of extension for the cartilage, if firmly gripped between the two bones, to be torn from its attachment to the capsule anteriorly.

Varieties of Injury.

The term "loose cartilage," so commonly employed, is apt to be misleading. It may be stated positively that when internal derangement of the knee results from injury to a semilunar cartilage that the cartilage is fractured or torn to a greater or less extent. Clinical experience shows that in about half the cases operated on, the rent in the cartilage is longitudinal (*i.e.* circumferential). Longitudinal tears may involve the anterior portion of the cartilage, the entire cartilage, or less commonly the posterior portion. The longitudinal tear may be combined with a transverse split, resulting in the production of a loose tag with the free end directed either forwards or backwards. When the fracture involves the whole circumference, the ruptured portion will frequently be found encircling the condyle on its mesial side. This type of injured cartilage has been appropriately described as "bucket handle."

The mechanism of a tear involving the posterior portion only of the cartilage is difficult to explain. It occurs occasionally, and is very liable to escape observation. Usually it cannot be recognised at the time of operation until the anterior attachment of the cartilage is divided and drawn forwards. When this is done, should there be a detachment posteriorly, the cartilage will come forward with a snap. Occasionally the free border only is torn and frayed out. The damaged area may become thickened by chronic inflammation and a pedunculated body result, which may be detached later and form a loose body.

Simple transverse fractures are sometimes met with usually opposite the anterior border of the internal lateral ligament. Occasionally the cartilage is torn from its anterior attachment, and in rare instances from its posterior attachment.

After severe injuries to the knee with damage to the cartilage, especially after recurrences have repeatedly occurred, the cartilage may be found to be crushed and mutilated out of all recognition.

In all cases in which the cartilage is extensively torn from the coronary attachment, a varying amount of cartilage remains attached to the coronary ligament, showing that a split in the circumference has occurred. In some cases the tear is quite close to the coronary margin, but in others a considerable portion remains, so that at first sight it may not be apparent that an injury has occurred. Sometimes when the joint is opened the cartilage appears quite normal, but when carefully examined will be found to be split, but with the parts in apposition. In these instances it is sometimes possible to produce displacement by manipulation of the leg, the inner portion slipping past the condyle into the intercondylar space.

External Cartilage.

In only about 10 per cent. of the cases of internal derangement is the external cartilage involved.

The external cartilage is not attached to the capsule of the joint, and consequently has more freedom of movement and is less liable to injury. Furthermore, in the movements of the knee very little inward rotation and practically no adduction of the leg on the femur occurs, and thus the important factors in the production of injury to the internal cartilage (*vide supra*) do not arise in the case of the external.

When internal derangement is the result of hypertrophy of synovial fringes, the primary symptoms are less acute. Pain is less severe and there is usually some creaking in the joint.

When loose bodies are present the joint may become locked, but usually only momentarily, and the loose body or bodies can often be felt or isolated in the synovial cavity.

Signs and Symptoms.

The usual clinical history is as follows: A sudden fall accompanied by (a) *severe pain* in the knee; (b) *locking* of the joint, followed by (c) *swelling* a few hours later; (d) a *crack* heard at the time of the accident, with (e) *recurrence* of the dislocation occurring later from some trivial cause, and (f) *freedom from symptoms in the interval.*

Injury to the semilunar cartilages usually occurs in young active adults. It is an extremely common accident among miners and football players; it is far more common in males than females. As already stated, an injury severe enough to tear a cartilage from its attachments—in other words, to produce a fracture of the cartilage—must produce violent stretching of ligaments, so that pain, and usually severe pain, is a fairly constant symptom. Although pain is to be expected, and is often so severe as to induce a faint, yet it does occasionally happen that a rupture occurs without severe pain.

Locking.—Locking of the joint at the time of the accident, though common, by no means always occurs. Usually when the knee is locked it becomes locked in partial flexion, and there is inability to fully extend the limb, though flexion is not restricted. Attempts to fully extend the limb produce pain over the cartilage and in the hamstring muscles. Occasionally it is found that full flexion is checked and that extension is painless. In these cases the posterior portion of the cartilage is usually displaced. Both full flexion and full extension may be impeded, and then it will probably be found that a loose tag exists which gets caught both in flexion and extension. In recurrent cases the locking of the joint which occurs is not so likely to produce pain owing to the fact that the ligaments are already stretched and relaxed.

The more chronic the condition—that is, the more frequent the recurrence—the less severe will be the pain. In recurrent cases it will usually be observed thas the patient is able to reduce the dislocation by his own manipulations—manipulations which vary in a remarkable way in different individuals.

Swelling.—Synovitis is an invariable sequel to the initial rupture of a semilunar cartilage. It varies in degree with the severity of the injury. At the time of the injury the effusion is no doubt blood-stained. If the displacement is reduced at the time of the injury the effusion readily subsides. If it is not reduced, so that the knee remains in a deranged condition, then the effusion is apt to become chronic.

In recurrent dislocations some effusion generally occurs. There is a tendency for the effusion to be less obvious after repeated displacements, and in very chronic cases displacements may occur with little or no disturbance in the joint.

Clicking.—It is quite common to find that there is a history of a click occurring when the cartilage is displaced. This is more commonly noted during recurrences than at the time of the original injury, when the severe pain which occurs is apt to mask all other symptoms, and may, indeed, often be produced by the surgeon's manipulations.

Recurrences.—Unless an injury to the cartilage has been adequately treated in the first instance, recurrences are certain to occur. This fact should be borne in mind in arriving at a diagnosis in doubtful cases of injury to the knee.

Diagnosis.

In the great majority of cases the diagnosis will depend on the history of the accident. It must be borne in mind that the initial injury may be produced either by a severe accident, *e.g.* the foot being caught between the spokes of a wheel with the body on the ground, or it may result from quite trivial accidents, such as swinging round suddenly on one leg, kicking at a football, being thrown off the balance while in a squatting position, or even catching the toe against a projecting body unexpectedly.

Once the injury has occurred, recurrences may occur from very trivial causes—for example, catching the foot against the bed-clothes while turning over in bed. Almost invariably it will be found that the position of the limb immediately prior to the accident was one of flexion, combined with rotation of the foot outwards, and when an accurate history is obtained, for example—when the patient is a medical man—it will nearly always be found that the leg was abducted from the thigh.

In some instances the accident occurs with the

foot fixed while the patient's body swings round, and it is possible that the studs worn by football players on the soles of their boots increase their liability to accidents of this nature.

Miners, who work invariably in a stooping position, are very liable to this accident. In some instances it is not possible for them to stand in the upright position, and at first sight it seems difficult to understand how extension can be a factor in producing the injury under these conditions.

No doubt the cartilage becomes caught between the bones when the limbs are flexed, and the actual completion of the damage can easily occur in falling to the ground, when it is probable that the extensors will contract.

The diagnosis of injury to a semilunar cartilage will usually be easy at the time of the accident, and will not be difficult if there is a history of recurrences, or if the cartilage is out of place when the patient comes under observation. In long-standing cases some relaxation of the internal lateral ligament can easily be noted and also some thickening of the synovial membrane. Only in rare instances can displacement of the cartilage be felt externally. This may occur when the anterior extremity of the cartilage becomes detached. Normally in full extension the anterior portion of the internal cartilage is squeezed forwards by the internal condyle and can be felt to fill the gap between the bones. In the case of a longitudinal tear close to the attached margin, when the detached portion becomes dislocated towards the middle of the joint, a groove can sometimes be observed between the bones instead of the normal protrusion in the extended position.

Synovial fringes.—It will not always be easy to diagnose between an injury to the cartilage and the nipping of a synovial fringe. Synovial fringes large enough to be caught between the bones do not occur in healthy joints, consequently there will, as a rule, be some history of chronic disease in the joint involving the synovial membrane. The symptoms which occur when a synovial fringe is caught, though similar to the symptoms of a locking cartilage, are usually less marked, and do not give rise to so much disturbance. It may sometimes be difficult to decide whether a joint in a young subject is inflamed as the result of traumatism and internal derangement, or as the result of tuberculous disease with hypertrophy of the ligamentum mucosa. Limitation of movement, pain on movement, pain at rest, muscular wasting, slight rises of temperature, and the absence of the classical history of locking will serve to differentiate well-marked cases; but cases must occasionally occur when an accurate diagnosis cannot be arrived at with certainty without an operation.

Loose bodies.—When loose bodies exist as the result of chronic disease locking may occur, and the condition simulate injury of a semilunar cartilage. Loose bodies, when they give rise to symptoms, nearly always attract the attention of the patient, and at some time or other can be located in the superficial areas of the joint. The patient may have a trick of fixing a loose body in a particular position. In other instances, when bone is present in the loose bodies, a diagnosis may be arrived at by means of the X rays. Osteomata and exostoses sometimes produce symptoms suggestive of internal derangement. They can, of course, be recognised by means of X rays.

Among other injuries which give rise to symptoms of internal derangement we must include rupture of one or other of both crucial ligaments and fracture of the tibial spine. Injuries to the crucial ligaments and fracture of the tibial spine are always the result of severe violence, and seldom occur without injury to the lateral ligaments. The damage is usually produced by forcible rotation of the leg on the thigh or of the body on the leg—as, for example, when the leg is caught between the bars of a gate. If the anterior crucial ligament is torn while the posterior remains intact it will be found that the tibia can, when in the extended position, be made to slide forwards on the femur to an abnormal degree. If the posterior ligament is torn and the anterior remains intact then the tibia can be pushed backwards on the femur without flexion.

When both ligaments are torn this to-and-fro move ment may be very striking, especially if the lateral ligaments have been stretched. Rotation inwards of the leg on the thigh is normally checked by the crossing of the crucial ligaments as well as by the lateral ligaments, so that an injury to either or both of the crucials permits an unusual degree of internal rotation.

Treatment.

Dislocation of a semilunar cartilage is certain to be followed by recurrences unless prompt and

efficient treatment is carried out to secure union of the damaged structures. The length of time required for recovery will vary with the extent of the injury, and the chances of a complete cure must depend on the extent of the damage to the cartilage. It is essential, in the first instance, to secure complete reduction by manipulation aided by the voluntary efforts of the patient. If this is unsuccessful manipulations under an anæsthetic usually succeed in recent injuries, and often in dislocations of some weeks' duration. Complete reduction may be obtained by full flexion and internal rotation followed by sudden extension. If the leg can be fully extended without force and will remain in the extended position reduction has been accomplished, except in rare cases of injury to the posterior extremity. Reduction must be followed by complete rest and fixation of the limb in the extended position for at least three weeks, and massage should be employed daily. At the end of 3 or 4 weeks the patient may be allowed to walk, but with the limb extended and fixed in a splint. At the end of about 6 weeks limited flexion may be allowed, but *rotation* should be checked by means of an Ernst splint. After about 3 months full use of the limb may be permitted. If, after this, a recurrence occurs no further attempt should be made to secure union by rest and fixation. Either an instrument to check rotation should be worn or an operation performed.

Operative Treatment.

If the patient is young and leads an active life or follows an occupation of a dangerous nature (especially in the event of a fall), there should be no hesitation in recommending removal of the cartilage.

Age in itself is no contra-indication to operation, and the results of operation in skilled hands are surprisingly good. No functional disability follows removal of a meniscus. The internal lateral ligament should not be divided for fear that the resulting scar may stretch, and so weaken the internal support of the knee. If it is found necessary to divide a portion of it, it is preferable to do so above the line of the joint where the ligament is comparatively narrow.

The operation should be performed with the leg hanging over the end of the table, and the surgeon should sit with the patient's foot between his knees. He is then able to manipulate the limb with his knees while working with both hands. An oblique or transverse incision through the skin gives the best exposure. If the anterior portion only of the cartilage is damaged it is advisable, though perhaps not essential, to remove the whole meniscus. If the anterior portion is intact and suspicion rests on the posterior portion, the anterior extremity must be divided and the cartilage drawn forward, when the posterior portion, if split, will often come forward with a snap. The joint should be washed out with saline and all hæmorrhage carefully checked, if necessary with adrenalin. Drainage is not necessary. When a loose body (or bodies) exists it may be washed out by means of irrigation, or when possible isolated and fixed by an assistant before exploration. Hypertrophied synovial fringes should be removed and special care taken to check hæmorrhage before the capsule is closed. The synovial membrane and ligamentous capsule should be separately sutured. In exceptional and doubtful cases it may be necessary to divide the patella vertically to secure a thorough exploration of the joint. When the crucial ligaments have been torn this method is essential if any attempt is to be made to restore the function of the joint by the manufacture of new crucial ligaments, either by tendon transplantation as practised by Hey Groves and others, or by inserting new ligaments of plaited silk (Trethowan). When both external and internal ligaments are damaged division of the patella is recommended.

Influenzal Pneumonia in Parturients.—In the 'Ugeskrift for Laeger,' Petersen reports 23 cases with a death-rate of 43 per cent. This confirms the German view of the gravity of influenzal pneumonia in labour and the puerperium. Benthin reported in Germany a death-rate of 54 per cent. and Ottow of 76 per cent. Delivery usually proceeded easily, and the best results were obtained when it was left to Nature. The period of expulsion is the most dangerous phase, and any anæsthetic seems fraught with special peril.—*Journ. Amer. Med. Assoc.*, p. 730.

MARCHING-FRACTURE.

By DAVID M. GREIG, C.M., F.R.C.S.Edin.,
Senior Surgeon, Dundee Royal Infirmary, etc.

THOUGH the occurrence of fracture of the metatarsals has been recognised as liable to take place during prolonged exertion, and especially during prolonged exertion while carrying heavy weights, its existence is not so widely known as its frequency in the late war renders necessary. The patient is unaware of a fracture though he is aware of a strain, and the medical attendant is very likely to accept the patient's suggestion and overlook the real condition. In this country, where the army used to be so little in evidence, marching-fracture has but a small literature. In most text-books on fractures its existence is not even referred to; but in countries where all able-bodied men are called upon to take part in their country's defence the condition has been often described. It is probably in France that the existence of this fracture was first recognised, but in more recent years German writers have added many monographs on marching-fracture. Cases of this sort have been described by Tobold (1) and von Bergman (2), who agreed as to the nature of the injury and its ætiology; but until radiography came into vogue absolute proof was not always easy to obtain.

In British journals interest in this accident was re-awakened in a paper by Pirie (3), in which he describes a series of six cases and illustrates them by radiograms. In a later paper the condition is capably and succinctly dealt with by Jones (4), who describes the unusual occurrence of a symmetrical marching-fracture of both second metatarsals. In one of Pirie's patients two metatarsals (second and third) were fractured, and in his other patients but a single bone. In two cases the fracture was of the second; in two cases of the third; and in one case of the fourth metatarsal. Pirie observes that flatness of the feet or being unaccustomed to much walking would predispose to the occurrence. Fracture takes place after the foot is thoroughly tired and the patient is not conscious of the moment at which the bone gives way, though in one of Pirie's patients a "sudden acute pain" was noticed on the tenth day of continuous marching. It is interesting to note that in most cases the soldier is able to continue at duty for some time after the accident. Thus in none of Pirie's cases did the patient report sick at once; five continued on duty during three weeks, and one during six weeks after the fracture.

Bozhidar Filipovitch, æt. 17 years, a Serbian refugee, was referred to me by Professor Kynoch on December 19th, 1917, complaining of a painful left foot of some months' duration. Eighteen months previously he had taken part in the exodus of Serbs from his native country, and had marched a distance of some five hundred miles through Albania in bad weather, over rough roads and through much snow with great and continuous exertion. The time occupied by this march was about two months. After that he had a prolonged rest and little exertion and came to this country. When he began to move about again he felt his left foot painful, the pain being referred to the region of the head of the second metatarsal.

I found him to be a well-developed and well-nourished lad, with a distinct, though not excessive degree of flat-foot. Proximal to the second metatarso-phalangeal joint there was a slight fulness to be seen, and on palpation this was felt to be due to an osseous collar round the bone. A radiogram showed that there had been a fracture of the neck of the second metatarsal now surrounded by some callus (Fig.). The movement at the metatarso-phalangeal joint was slightly restricted in dorsi-flexion.

It is common knowledge that the first and fifth are the strongest metatarsals, the second being weakest, and the third and fourth about equal in their ability to resist a prolonged strain. But it is probable that the way in which the second metatarsal is wedged in between the internal and external cuneiform bones interferes to some extent with its freedom of movement, and when the muscles are exhausted and the ligaments in relaxation in an over-tired and atonic foot, fracture of that bone may be predisposed to. The first and fifth metatarsals do not escape fracture, though they are not liable to marching-fracture. In two cases of fracture of the fifth metatarsal from sprain which have come under my observation, the fracture occurred in the tuberosity of that bone. This experience is supported by a case described by Graham (5), and a personal experience by Jones (6); but in these cases, too, it was the base and not the

Marching-fracture of neck of second metatarsal.

shaft or neck that gave way, whereas in marching-fracture it is the body of the bone which is affected, particularly towards the neck of the metatarsal.

The old-time dictum is probably expressed by Hamilton (7) when he writes of the metatarsal bones: "these bones can scarcely be broken except by direct blows"; but radiography has much changed the general opinion on this point.

My case bears out that in times of stress the patient does not become immediately incapacitated by a marching-fracture, and though slightly lamed, may continue even strenuous exercise for an indefinite period. To substantiate this point by fracture from another cause than marching:

A woman, æt. 25 years, had the shaft of the second metatarsal broken at her work by a direct injury—the fall of a weight on it two years previously. Under ordinary conditions she would doubtless have found herself incapacitated from work and even claimed compensation, but as she was to be married two days after the date of the injury she "carried on" without complaint, and only after the lapse of two years concluded that the discomfort was worth investigation. The site of the fracture was shown by a globular mass of callus, which gave rise to some weakness on exertion and some tenderness to pressure.

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Carcinoma in a very Young Woman.—To those who believe that cancer of the cervix occurs only in middle-aged women, the following case, which has been reported by Stein, will be of interest. A woman, æt. 20 years, who had had two children and one miscarriage, complained of bleeding profusely and constantly. Four weeks previously she had been curetted and uterine polypus diagnosed. Upon introducing a speculum into the vagina a large irregular, cauliflower-shaped mass growing from the cervix was found. It was extremely soft and bled upon the slightest touch. With much difficulty the uterus and adnexa were removed, but the involved iliac glands were left behind as the condition of the patient did not warrant prolongation of the operation, which would have been necessary to remove them. When the specimen was opened, it was found that the carcinomatous growth was about the size of a child's fist, originating in the anterior cervical canal and had practically destroyed the whole anterior lip. Microscopic examination showed a papillary zone of acini of polyhedral epithelial cells which were invading the surrounding tissue in all directions. In these cells mitotic figures were common, as were areas of necrosis and hæmorrhage. Altogether the picture was unquestionably one of carcinoma.—*Amer. Journ. Med. Sci.*, p. 722.

TWO CASES OF BELLADONNA POISONING.

By T. GILLMAN MOORHEAD, M.D, F.R.C.P.I.,
Physician, Royal City of Dublin Hospital.

THE symptoms of acute belladonna poisoning are so distinctive that at first it seems almost impossible that they should not be immediately recognised; but when the poisoning is accidental and occurs in advanced age, a diagnosis of cerebral hæmorrhage may easily be made, as will be seen, I think, by the briefly reported record of two cases which have come under my notice. In each case the poisoning resulted from the use of belladonna prescribed for therapeutic purposes, and in one of them at least it was hardly possible that any suspicion of the cause of the symptoms could have arisen until after the patient's recovery.

In June, 1914, I received early in the morning an urgent message to go and see a gentleman, æt. 84 years, who had occasionally been a patient of mine when his usual medical attendant was away from home. On arrival at his house I found him lying in bed quite unconscious and breathing stertorously.

The history I obtained was that he had gone to bed quite well the previous night, except that he was complaining of lumbago, and that on the following morning he had been found lying beside his bed quite unconscious. It appeared that he had got out of bed to pass urine, as a urinal was placed close beside him. The only fact in relation to his previous history that is of importance is that he was known to have passed sugar in his urine in considerable quantities for the last twenty years or more.

On examination, I found, as already stated, that that patient was quite unconscious and was breathing stertorously. The pupils were widely dilated, equal, and did not react to light; the pulse was 100 and of rather low tension, but there was extreme arterial degeneration; there was slight general muscular rigidity, the muscles of the back of the neck being decidedly stiff; deep reflexes were exaggerated. There was no sign of unilateral paralysis Apart from the fact that the bladder was distended there was nothing else to be made out.

I was rather puzzled as regards diagnosis, for the case did not seem to me to fit in with either cerebral hæmorrhage or thrombosis on the one hand, or diabetic coma on the other. While debating the question in my mind, I proceeded to move the patient into a more comfortable position in bed, and then found on his back a pad soaked apparently in a liniment containing belladonna. This gave me a clue, but by no means a certain one, and I immediately sponged off all traces of the application. I then asked for a consultation. On arrival, the consultant, a man of great experience, had no hesitation in pronouncing the case as one of diffuse cerebral hæmorrhage, probably located on the upper surface of both hemispheres. With this opinion I did not altogether concur, but I mention it as showing the extreme similarity of the symptoms to those of cerebral hæmorrhage. After emptying the bladder, I started giving saline injections into the bowel, and refrained from further treatment. During the day I visited the patient frequently, and about six hours after I had first seen him, began to feel complete confidence that I was dealing with a case of belladonna poisoning. The skin became flushed, the pulse very fast, the mouth dry, and there was much sneezing. Towards evening the patient began to wake up, and to talk incoherently and about midnight sat up in bed, and began to relate anecdotes in a wildly hilarious manner. By means of sedatives, a quiet night was ultimately obtained, and the next morning he was nearly all right, though for several days some confusion of thought and unusual jocularity persisted. I later learned that the patient had been undergoing massage for some weeks, and concluded that probably this had made the skin more than usually capable of absorption, and hence the symptoms resulting from what proved to be a diluted belladonna liniment.

The second case was that of a lady, æt. 75 years, whom I saw in consultation at a nursing home just after she had been brought there by an ambulance. The history obtained from her daughter was as follows: She had got up as usual that day, and had determined to go in to Dublin by train from her place of a residence some twelve miles away. In the train she at first seemed quite well, but after being in it about ten minutes got rather confused in talking, and fell back semi-conscious. On arrival in Dublin she was able to make an attempt to stand up, but on doing so fell to the ground quite unconscious. She was seen by a doctor, who immediately brought her to a private home and asked me to see her. I found her in much the same condition as the other patient. She was quite

unconscious, the face flushed, the breathing stertorous, the pupils dilated and not re-acting to light, the pulse rather fast, and there was in addition extreme motor restlessness. First the face would twitch, then one arm, then perhaps the legs, and at times the whole body would move in a convulsive manner. A catheter specimen of urine was obtained and found quite normal. I concluded that some acute vascular catastrophe had occurred probably on the surface of the brain, and treated the case accordingly. A still further opinion was asked for, and so a doctor who had seen her before was sent for. He agreed with me that there was no doubt whatsoever as to the nature of the case, but refused to differentiate between cerebral hæmorrhage, thrombosis, or embolism. The patient remained unconscious all that day and the succeeding night. The muscular restlessness was, if anything, more pronounced towards evening, but ceased after the injection into the rectum of a large dose of potassium bromide. Next morning there was a slight return of consciousness, and the patient became able to swallow, and by the middle of the day began to talk. There was at first incoherence and general restlessness, but this subsided in the course of a few days, and the patient was then perfectly well. The nature of the illness became clear only after the patient herself told me that she had some atropine eye-drops, and that on the morning of her illness, she had accidentally mistaken these for a tonic she was taking and had put a teaspoonful of the drops in her mouth. She immediately recognised her mistake and spat out the dose, but evidently absorbed enough to produce the symptoms described.

The points of interest in these two cases are: (1) the similarity of symptoms to cerebral hæmorrhage; (2) the age of the patients, it being of course a matter of common knowledge that elderly people are peculiarly sensitive to belladonna; (3) the muscular rigidity in the one case and the muscular restlessness in the other; while the patients were quite unconscious; (4) the apparent ease of absorption of a belladonna liniment following a course of massage. The patient who had used the liniment stated that he had frequently used belladonna before, so that the case cannot have been one of simple idiosyncrasy. I have seen other cases in which extreme local irritation followed the application of a belladonna liniment to an area which had been previously massaged.

REVIEWS.

CLINICAL DISORDERS OF THE HEART-BEAT. By THOMAS LEWIS, M.D., F.R.C.P., D.Sc. Fourth Edition. London: Shaw & Sons, 1918. (Demy 8vo, pp. 120; 54 figures. 6s. net.)

A fourth edition shows the popularity of this manual. Except for some additional paragraphs, the new edition does not vary much from the last. The value of objective records in place of the previous subjective ones, many of which are now deemed unsound, is indicated largely by the graphic method. Familiarity with the heart's mechanism in health and disease is insisted on—in fact, the author asserts that the practitioner who does not possess this qualification is incompetent to deal with cardiac patients. He advises the regular use of the sphygmograph in routine practice, at the same time admitting that the necessary skill and experience involved in taking and interpreting graphic records will absorb too much of the general practitioner's time and energy. The purpose of this hand-book is not to discuss the evidence upon which the diagnosis of cardiac disease rests, but to enable the practitioner to note such symptoms and signs as the author has found serviceable in identifying these disorders. One wonders if at the present time the average practitioner could accurately define the difference between auricular fibrillation and auricular flutter, or state his prognosis in regard to them, which, after all, is what counts most highly in the cardiac patient's mind. Dr. Lewis gives substantial help in regard to this and kindred disorders. On p. 66 the following important statement appears: "In my judgment there is no sufficient evidence that a healthy heart is ever damaged by muscular exertion, however severe and prolonged that exertion may be." The capacity of the normal heart to withstand additional strain is stated to be enormous, and the case of the horse, in which heart affections are conspicuous by their rarity, is cited. The nature, recognition, prognosis and treatment of "heart-block" are clearly defined. The treatment throughout is clear, and yet more comprehensive than in the average text-book dealing with the heart.

BURNS AND THEIR TREATMENT. By J. M. H. MACLEOD, M.A., M.D., F.R.C.P. London: Hodder & Stoughton, 1918. (Foolscap 8vo, pp. 160. 6*s*. net.)

The war has been largely responsible for the issue of new medical books and for fresh editions of old ones. The present work is one of the former class, and shows how vastly the treatment of war injuries has altered from that of bygone days, especially with regard to burns. The book is dedicated to "Our Heroic Airmen," and deals with burns caused by heat, electricity, lightning, X rays, radium, sun and corrosives, dermatitis and the malingering associated with it. The author strongly deprecates the time-honoured application of oils, such as carron oil and carbolic oil, since they conserve the heat, increase local discomfort, and encourage sepsis instead of retarding it, so that a burn of the second degree, instead of healing quickly, may be transposed into one of the first degree, and heal slowly, with formation of a subsequent scar. Another fallacy with regard to old-fashioned local treatment is exploded. This is the idea that the exclusion of air is important. Instead it is contended that a raw, granulating surface should be exposed to the air, and the formation of scab encouraged by powdering the surface with a bland aseptic powder. One of the most instructive chapters deals with the all-important subject of shock as a sequel to burns.

Dealing with the administration of opium, on which medical opinion is divided, the advice is to reserve its use for those cases where the pain is almost unbearable, or where it is obvious that a fatal issue is beyond doubt. The author states that, as a rule, the more profound the shock the less the pain. When a large surface is involved he advocates immersion in a bath, with a temperature of 80°–100° F., for several hours, till there is sufficient improvement to justify the patient's removal to a warm bed. Saline infusions, adrenalin and pituitary extract are employed, while stimulants, such as strychnine, alcohol, etc., are to be avoided until reaction is assured—a rule more honoured in the breach than in the observance, unfortunately.

The "paraffin" treatment is detailed, and a useful formula given, which can be used without the spray apparatus. The book is well illustrated, and has a complete index.

THE STATICS OF THE FEMALE PELVIC VISCERA. By R. H. PARAMORE, M.D., F.R.C.S., Maj. R.A.M.C. London: H. K. Lewis. Pp. xviii + 383. Demy 8vo. Twenty-six illustrations, including 23 plates. 18*s*. net.

The first volume of this work extends to 380 pages and is well illustrated. The author states his views at great length and is very apt to repeat himself. He holds that the female pelvis owes its shape, not so much to development and adaptation to the functions which it is destined to perform, viz. child-bearing, but to the effect of certain internal forces which are more or less continuous in their definite pressure, and are reinforced at times by coughing, straining at defæcation, etc. He does not explain why these forces act more in the female than in the male, nor why he considers them at one place of a hydraulic nature, and elsewhere as possessing the properties of elastic recoil, as when he wants their aid to hollow out the sacral curve. He touches only incidentally on the pernicious effects of tight-lacing and the inability of muscles unaccustomed to heavy and regular work to bear the strains of coughing and of gestation, or the occasional efforts of a heavy lift or even of an active game of tennis. He shows that the attachments of internal organs, sometimes called ligaments, composed as they mostly are of blood-vessels, a little loose connective tissue and fat and a covering of peritoneum, are quite inadequate to support, *e.g.* the liver, kidneys, or a loaded colon, and he justly derides the futility of any surgical proceeding devised with a view of shortening such attachments. Gastroptosis and displacements of the uterus he attributes to functional weakness of the musculature of the pelvic floor and lower abdominal wall. This is surely no new discovery, albeit there may still be some who believe what was taught a generation ago. On the whole the author gives everywhere evidence of having bestowed a great deal of thought to this subject besides having a very wide knowledge of its literature, both recent and ancient, but the book would be improved greatly by judicious condensation, which would not only make it more lucid and interesting, but more suitable for reference by the general practitioner.

THE ROMANCE OF THE HUMAN BODY. By RONALD CAMPBELL MACFIE, M.A., M.B., LL.D. London: Wells Gardner & Co., Ltd., 1917. Price 5*s.* net.

The war has discovered quite a number of medical men who can use the pen. The author has succeeded in investing the human body, its functions and members with a halo of interest and wonder which will appeal, not only to medical readers, but to laymen, for it is not burdened with medical terms. The figures used to represent certain data have a nodding acquaintance with those used in books dealing with the heavenly bodies; they are bewildering in immensity. Dr. Macfie has succeeded in producing a book which adds to our knowledge, and at the same time stimulates the desire to know more.

THE PANEL DOCTOR: HIS DUTIES AND PERPLEXITIES. By T. M. TIBBETTS, M.D.Lond. Birmingham: Cornish Bros., 1916. Price 1*s.* 6*d.* net.

This book constitutes a worthy and sensible guide to those who have accepted service under the National Health Insurance Act. Every feature of panel practice is reviewed, and by an easy style of stating them, many of the apparent difficulties and disadvantages of panel work seem to disappear. By means of a useful and complete index, information under any particular heading can be seen at a glance. Dr. Tibbetts has rendered a service to the profession by writing this book. The busy practitioner should have it always at hand. Nothing seems too trivial to mention or explain.

Hæmorrhage Following Opening of a Peritonsillar Abscess.—A. J. Hutchison reports the case of a girl, æt. 16 years, who had a quinsy on the right side which burst spontaneously, but after a few days re-formed. Although it discharged a considerable quantity of pus and blood daily it remained swollen and extremely painful. When seen by Hutchison the second peritonsillar abscess had been present for about five days, and the discharge had been copious for two days. The patient was very ill, with an up-an-down septic temperature, poor pulse, thickly-coated tongue, very offensive breath, severe pain in the throat and neck, and such difficulty and pain on swallowing that she had taken but little nourishment for some days. There was the usual pain and difficulty in opening the mouth, but it could be opened sufficiently to get a view of the fauces. The right tonsil was pushed beyond the middle line, and there was a large, tense-looking swelling of the anterior pillar and soft palate, œdematous uvula, and so on. Externally was a large, tender swelling, extending well down the neck. After feeling for a soft spot Hutchison opened the quinsy with a pair of StClair Thomson's forceps. A little pus came out as the forceps were introduced, but their withdrawal was immediately followed by a gush of blood, like the bleeding occasionally occurring when enucleating a tonsil. The patient, greatly alarmed, sat up and coughed and spat mouthfuls of blood over the bed and all around. Hutchison made her lie down, and, introducing his finger into the mouth, easily stopped the bleeding by quite gentle pressure on the incision. As soon as possible he replaced his finger, which the patient naturally could not help biting, by a swab on a long holder, and kept up the pressure for about twenty minutes. On removing it then the bleeding had ceased. About three-quarters of an hour later the patient complained that her throat was swelling up inside, suddenly sat up in bed, and began to pour blood from the mouth again. Hutchison again applied a swab and stopped the hæmorrhage. After ten minutes of this pressure the hæmorrhage had again ceased. The question then arose as to what should be done to prevent recurrence. Tying the carotid was ruled out by the septic condition of the neck; plugging the wound, of course, was quite impossible. The only practical plan seemed to be to sit beside her ready to re-apply pressure if it should be required. No further bleeding took place, but she gradually sank, and died of syncope during the night.

Whether, apart from the hæmorrhage, she would have died it is impossible to say. She was very ill and in a septic condition, but was not moribund before the hæmorrhage occurred. Whether the forceps directly tore a vessel, or whether a vessel, which had been nearly eroded, ruptured when the pressure was suddenly reduced, could not be determined.—*Journ. of Laryngol., Rhinol., and Otol.*, p. 22.

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REMARKS ON APPENDICITIS.*

By JAMES SHERREN, F.R.C.S.,
Surgeon to the London Hospital.

INFLAMMATION of the appendix is the commonest surgical abdominal disease; it is also the one in which most errors in diagnosis are made. It is again to remind you of this that I am taking up the subject to-day. In early accounts stress was always laid on the right-sided nature of the symptoms. This is understandable when one remembers that it was only late in its history that the part played by the appendix was recognised, and surgeons were asked to see the patients before the presence of a swelling indicated the late stage of the disease. The symptoms of acute appendicitis have, however, been correctly described for at least 25 years. Treves, in his early writings laid stress on them, and Lockwood was particularly emphatic on the subject, to mention but two in this country who were instrumental in establishing surgical treatment. It is therefore difficult to understand why mistakes are so constantly made in this respect.

The first point I wish again to impress on you is that the prominent symptom of appendicitis is not pain in the right iliac fossa or the right side of the abdomen. Patients with pain confined since its onset to the right side of the abdomen are frequently sent for operation as chronic appendicitis. Whatever the cause of the pain it is not removed with the appendix—if you are ever weak enough to take this easy method of "treatment." This type of pain is particularly common in women.

On the other hand, it is not unusual to see cases in which operation is delayed because the pain has been a general abdominal one. I recently operated on a lady who had been seized at night with colicky general abdominal pain and vomiting, called by the medical man who saw her ptomaine

* Clinical lecture delivered at the London Hospital.

poisoning—she had dined at a restaurant and thought the fish bad. I may say this is a frequent diagnosis. The attack passed off, and 14 days later I was asked to see her as an abdominal tumour had been discovered. A few years previously she had had a left ovarian tumour removed, and it was suggested that the lump on the right side might be of a similar nature. The history was of a typical attack of acute appendicitis and the lump an appendix abscess. I need hardly tell you that had the correct diagnosis been made at the time of onset the patient would have been saved a long and dangerous illness.

During my last period of full duty I saw three patients illustrating the points I wish to emphasise. Two were sent in as appendicitis with wholly right-sided pain; the third, because of the general nature of the pain, was not diagnosed. Of the two with right-sided pain one had a large pyonel phrosis; in the other I could find nothing beyond constipation to account for an aching pain confined to the right iliac fossa. The third patient had been considered gynæcological. The pain was general and she had described it as being like labour pain. Dr. Luker, who saw her, reported that the pelvic organs were normal. When I saw her I considered the history typical of acute appendicitis, and at operation—60 hours after the onset of the disease—found a large thickened appendix surrounded by a little pus and adherent to the under-surface of the mesentery of the ileum.

The symptoms of acute appendicitis consist of abdominal pain, umbilical or general, often waking the patient in the early hours of the morning, a temperature, and usually vomiting. Pain is always the first symptom; if vomiting or temperature precedes it, suspect the diagnosis. On early examination there will probably be superficial tenderness with increase of reflexes in the right iliac region; deep tenderness will certainly be present. This is enough: operation should be carried out without delay.

The appendix may be associated with an undescended cæcum and touching the gall-bladder, it may be in the pelvis or even left-sided; the *initial* symptoms are the same, but in the former the tenderness will be in the gall-bladder region, in the latter it may only be felt *per rectum*. Never neglect to examine the rectum.

I know of no exception to the rule that the pain in the first attack of acute appendicitis is general. If the first attack resulted in the appendix being buried in adhesions the pain at the subsequent attack *may* start in the right iliac fossa. This, however, is a great rarity, and I have only come across it on two or three occasions.

The following case, recently under my care, illustrates this, and also the importance that I am always impressing on you of careful history-taking and inquiry into past-abdominal disease.

A woman was admitted on July 1st, 1918, with a history of a severe attack of pain starting in the right iliac fossa 10 days previously. She was X rayed and her urine examined. On going into the history again I found that 4 years previously she had had an attack of general abdominal pain for which she had been treated by rest in bed. On July 5th, 1918, I removed a thick appendix containing pus.

Another patient was a boy, æt. 17 years, with a thick strictured appendix associated with an undescended cæcum and completely covered by adhesions.

The commonest cases to be sent in as acute appendicitis with right-sided pain are patients with urinary disease (particularly ureteric calculus or pyonephrosis), pleuro-pneumonia, and pelvic disease in women. Never omit to examine your patient for these diseases. A twisted ovarian tumour is a common cause of error. The following illustrates this:

In January, 1916, I was asked to see a nurse as a case of acute appendicitis. She gave a history of several violent attacks of pain in the right iliac fossa accompanied by vomiting. The present attack had lasted 3 days. The temperature was 103° F. and *per rectum* a swelling was evident in Douglas's pouch. At operation I retracted the lower right rectus outward and removed a right-sided ovarian cyst with a twisted pedicle.

I could quote several cases operated upon for right-sided abdominal pain without relief to the symptoms. The following is the type of case.

In December, 1916, I was asked to see a woman who had had 5 or 6 attacks of pain in the right iliac fossa during the previous two years, the last one the day previously. The pain extended to the groin. I felt certain the condition was not acute appendicitis. X-ray and urine examinations revealed no kidney disease. As her sister had

recently died of appendicitis and she had a great dread of the disease I was unable to satisfy her except by operation. I removed a normal appendix.

I do not intend to take up time over what is the correct treatment of this type of case to-day, but mention it to remind you not to expect cure by removal of the appendix.

In a clinical lecture on chronic appendicitis I gave 6 years ago* I laid stress on the fact that the pain in chronic appendicitis was not in the right iliac fossa. Not a month has passed since that date that I have not had occasion to refer to this. In my list of patients waiting for admission there are always cases of this nature put on the list for appendicectomy. There are two types of chronic appendicitis—one in which there are attacks of general abdominal pain at irregular intervals accompanied by tenderness over the position of the appendix if seen during an attack, and those cases in which disease of the appendix produces symptoms simulating those of chronic gastric or duodenal ulcer.

I think I have said enough to indicate the care necessary in diagnosis before advising operative treatment.

Treatment of Enuresis. — Grover regards enuresis as a symptom of neuromuscular fatigue, which is caused by excessive exercise, too little sleep, mental strain and an improper diet. After the cause has been removed the habit may remain, just as the spasmodic cough of whooping-cough persists long after the infection. Grover's treatment is hygienic and dietetic. No drugs, operations, or mechanical means are employed. Food is forbidden between meals. The diet includes milk, butter, eggs, meat, fish, bread, cooked cereals, macaroni, vegetables, oranges, stewed fruits, and simple unsweetened desserts. Soups, coffee, tea, cocoa, sweet and salty and highly seasoned food, sweets, pastry, cake, jellies and jams are forbidden. Meat, vegetables and eggs are forbidden at night. No fluids are allowed after 4 p.m. There are regular hours for urination at night, viz. 7 p.m. on going to bed, 10 p.m., and not again till 6 a.m. Children whose bladders cannot hold more than 2–3 oz. are made to urinate also at 2 a.m. The day-wetters are made to urinate at regular intervals from 20 minutes to 3 hours during the day, and the interval is gradually lengthened until a satisfactory result is reached. — *Brit. Journ. of Children's Diseases*, p. 116.

* Clinical Journal, September 24th, 1913, p. 385.

AN ANALYSIS OF 130 CONSECUTIVE CASES OF UTERINE FIBROIDS TREATED BY ABDOMINAL SUBTOTAL HYSTERECTOMY.

By RAOUL SEHEULT, M.D.,
Resident Surgeon, Colonial Hospital, Trinidad.

It is generally conceded that the uterus is, of all others, the organ most frequently affected by the growth of tumours, both simple and malignant. While it is difficult to estimate the percentage of women affected with fibroids and cancer of the uterus in this colony, 26 years' hospital practice has left me in no doubt as to their high incidence among the black and coloured sections of the population. Trinidad, the second largest of the British West Indian Islands, lies in latitude 10° north in the south-eastern part of the Carribean Sea near the mouth of the Orinoco River. Its area is 1974 square miles and its estimated mean population in 1916 was 345,324. Roughly speaking, about $\frac{1}{9}$ of the inhabitants are white, $\frac{1}{2}$ are coloured or mixed, $\frac{1}{18}$ black and $\frac{1}{3}$ East Indians. The estimated population of Port-of-Spain, the chief town, on June 30th, 1916, was 66,014 The total number of deaths registered in the colony during the quinquennial period 1911–1912 to 1915–1916 was 39,688, of which 478 were due to malignant growths, cancer of the uterus being responsible for 121. My impression is that the number of deaths from cancer is proportionately greater among the black and coloured inhabitants than among the whites and East Indians, but there are no official statistics of the colour or race distribution of deaths from this disease.

The records of the Colonial Hospital, which provides accommodation for 320 beds and serves Port-of Spain and the Colony generally, show that 7141 female patients (excluding those treated in the maternity and tuberculosis wards) were admitted during the 5 years ended March 31st, 1916, and of these, 113, or 1·5 per cent., were subjects of uterine cancer, and 241, or 3·2 per cent., of fibroids of the uterus. The admissions to the female wards were practically confined to black, coloured and East Indian women.

In view of the frequency of uterine fibroids in the colony and the apparent proneness of the

negro race to this affection, an analysis of 130 consecutive cases treated under my care by abdominal hysterectomy from February, 1911, to April, 1917, may prove of interest. It is remarkable that with the exception of 3 East Indians all the patients in my series were black or coloured women. This is interesting when it is borne in mind that the East Indians form about a third of the entire population. Before analysing these cases I would define my position with regard to certain debatable questions in connection with uterine fibroids.

First, with reference to the advisability or inadvisability of removing these tumours in all cases, I adhere to the school which advocates the radical cure, not only because of the symptoms complained of when the woman comes under observation, but also because of the dangers inherent in the natural course of the disease and its complications. It is sad to contemplate the years of invalidism or semi-invalidism which some women with fibroids endure when their lives might have been made happy and useful by the radical cure at an early stage. In experienced hands abdominal hysterectomy for fibroids has now a lower mortality than the disease. Competent authorities estimate the average operative mortality as about 2 per cent., whereas the fatality among the unoperated cases is considerably higher. It seems, therefore, unjustifiable to defer operation, which under normal conditions is attended with so little danger and confers such great benefit, to face at a later period increased risks when the indications may become urgent and conditions are often unfavourable. In my practice the question of advising early operation seldom arose, as most of the patients who consulted me presented tumours of considerable size or manifested symptoms which made operation necessary. Indeed, in a few instances operation was rendered hazardous by the complications which had arisen from the delay in seeking competent advice, and in some subjects the risks appeared to me to be too great to urge the radical cure.

I have no experience of the treatment by radium or the X rays, but the literature shows that these agencies may be placed in the category of symptomatic treatment, which gives good results occasionally. Operation, therefore, apparently remains the ideal treatment. In any case I do not believe that radiotherapy held out even the most remote hope of complete cure in the majority of my cases in view of the frequency of complicating conditions.

I do not propose to enter at any length into the merits or demerits of the various procedures for the removal of these growths, but merely state that the cases now dealt with by me are all cases of subtotal hysterectomy. While panhysterectomy is generally more difficult of execution, has a higher rate of mortality and more risks of post-operative complications than the subtotal operation, it does not appear to offer any compensating advantages.

The fear of a malignant growth becoming engrafted upon the cervical stump left behind in supra-vaginal amputation of the body of the uterus has not in my experience been realised. I am therefore in complete accord with those who consider that the cervical stump plays no part in the production of untoward after-effects.

There is one other point to which I may briefly refer and that is the treatment of the ovary. I am decidedly in favour of a rational degree of conservatism, not only to avoid as much as possible the sudden onset of an artificial menopause, but also to conserve whatever internal secretory function that organ may possess. There is no need to refer in detail to the procedure I adopt. I follow the usual technique with such deviations as circumstances require. Putting aside the question of rigid asepsis—the first essential upon which success in abdominal surgery depends—I wish to emphasise the importance of careful preparation of the patient, rapidity of operation, precautions against hæmorrhage and avoidance of raw areas.

Despite the usual practice, I do not operate in the Trendelenberg position. The reason is the lack of a proper table when I began these operations. Later, when it became available, I had acquired the habit of operating in the horizontal position, which I still follow in view of the successful results.

It is also my practice to irrigate the peritoneal cavity with warm sterile salt solution, leaving about a litre in the cavity before closing the abdominal wound. In my experience it prevents shock, lessens the effects of hæmorrhage and decreases the virulence of infection.

The points which I will consider in the 130 cases operated upon are age-incidence of fibroids, indications for operation, the complications, degenerative changes in the growths, relation between

fibroids and sterility, and after-effects of the operation.

Age.—At the time of operation there were, between 20 and 29 years, 23 cases; between 30 and 39 years, 62 cases; and between 40 and 49 years, 43 cases. Only 2 women were 50 or more. The youngest patient was 23, and the oldest, who had reached the climacteric 3 years before operation was 55.

These figures do not refer to the ages at the time of onset because in many of the patients these tumours had existed for years, but the analysis shows that while there was no case under 20 years, 17·7 per cent. of the cases were between 20 and 29 years, 47·7 per cent. between 30 and 39, and 33 per cent. between 40 and 49. The experience in Europe and America is that fibroids are rare under 30, not infrequent between 30 and 40, and relatively common between 40 and 50. The discrepancy between the two sets of figures is no doubt accounted for by the early onset of puberty in this tropical colony, but I am inclined to think the discrepancy is even greater than the above figures indicate, as the cases in my series belong to a type of patient who, whatever may be her complaint, generally seeks medical aid at a late stage of the disease, either through ignorance, poverty or indifference. Six of my cases at the time of the operation had reached the monopause at 39, 41, 47, 48, 49 and 52 years of age respecpectively. While the age-incidence of fibroids in my series does not harmonise with that given by other observers, for the reasons suggested above, it confirms the observation that the condition arises in the uterus during menstrual life. The pathogenesis, however, is by no means clear in spite of the various theories advanced.

Indications for operation.—Hæmorrhage, pain and pressure-symptoms were the main indications. In many cases there was a combination of two or more symptoms, but as a rule one symptom predominated. Of the 130 cases shown the operation was undertaken in 72 for hæmorrhage; pain was the chief symptom in 34, and bladder trouble in 13. In 3 cases, though the tumour was small and giving rise to no inconvenience, hysterectomy was performed. The remaining 8 cases included growths which, by their size, caused great discomfort and incapacitated the patient.

Menorrhagia was the usual type of hæmorrhage, and though varying in degree, was often severe. This symptom was frequently associated with the submucous variety or with tumours that were partly intramural and partly submucous. The severity of the bleeding even in cases with small submucous growths was surprising.

Metrorrhagia was occasionally present in combination with menorrhagia. It was remarkable how quickly, during the intermenstrual period, some of the patients recovered from loss of blood; on the other hand, others, who were reduced to a condition of anæmia and debility by constant and repeated floodings, had to be kept for operation until their health improved.

With regard to pain it was observed that this symptom was chiefly due to adhesions, disease of the appendages or incarceration of the tumour in the pelvic cavity. The size of the tumour appeared to exercise little or no influence in determining this symptom, for it was noticed again and again that many patients with large multiple growths were free from pain.

Pressure symptoms in many cases were mainly confined to the bladder, and manifested themselves in vesical irritation and frequency of micturition. In some instances there was also dysuria, but in no case was there actual retention of urine. These bladder troubles occurred chiefly in cases where the tumour was situated within the pelvis, and, as was generally found, impacted or bound down by adhesions. In 3 cases the bladder was pulled up and spread out over the anterior surface of the tumour. Curiously enough the rectum escaped the effects of pressure even in cases of impaction.

Complications.—Complicating conditions were remarkably frequent, occurring in 87 per cent. of my cases, and comprising mainly diseases of the appendages, adhesions, the result of localised peritonitis and impaction of the tumour in the pelvic cavity. These complications were seldom a guide for surgical intervention, and, as a matter of fact, were generally discovered during the operation. It was chiefly the pain resulting from these conditions that brought the patient and necessitated operation.

Disease of the ovary and tubes was very common, and occurred in 59 per cent. of my cases. This frequent association suggests that pathological changes in the appendages had been brought about

by the presence of the tumour, and were probably responsible for the sterility in many cases. The tubal lesions included salpingitis, hydrosalpinx, hæmatosalpinx and pyosalpinx; the ovarian comprised cystic degeneration, chronic ovaritis and large cystic tumours. Hydrosalpinx and cystic degeneration of the ovaries were the most common. Great care was taken to conserve the ovaries when possible, especially in young women, not only to obviate the artificial menopause, but also on account of their systemic influence. In 51 cases, however, one ovary had to be removed, and in 22 others both. In the remaining 57 cases the ovaries were conserved. Impaction of these tumours in the pelvic cavity was noticed in 20 subjects. These incarcerated growths arose generally in the cervix or in the lower end of the posterior wall of the uterus. Adhesions, involving omentum, intestines and tumour were frequent, and in some instances made the operation somewhat difficult and increased the risks of post-operative complications. The bladder was involved in adhesions in 9 cases.

Cardiac and renal complications were rare. While hæmic murmurs were commonly present in the very anæmic cases, organic disease of the heart was met with in only two subjects, who, curiously enough, were East Indians. In one case the cardiac lesion was mitral stenosis, and in the other fatty degeneration of the myocardium. Apart from anæmia and its effects there was no evidence of direct influence of these tumours upon the heart. In only 3 cases was albuminuria present, and this condition was apparently caused by the pressure, as the urine cleared up after the operation.

Complications affecting the tumour inself included secondary changes in the growth and impaction in the pelvic cavity. It is noteworthy that in none of my cases was there any association with malignancy, although cancer of the uterus is by no means an uncommon affection among the class of patients to which my cases belong. The comparatively early age of the majority of my fibroid cases must be borne in mind in considering this question, as the correlation of the uterine fibroids with cancer of the uterus seems to depend largely on the age of she patients. In one case amputation of the right breast for carcinoma had been performed 18 months before the patient came under my care for uterine fibroids. Three years after the hysterectomy she died of cancer of the other breast without any sign or evidence of cervical involvement. In this case the left ovary was removed with the uterus. Another case showed a small, hard nodule in the right breast 13 months after hysterectomy. The breast and tumour were excised with the affected axillary glands, and the patient, when last seen 10 months after this operation, was in good health with no sign of recurrence or suspicion of malignancy in the cervical stump. Both ovaries had been spared in this case.

In performing panhysterectomy for cancer of the uterus I have on 3 occasions found fibroids, but the tumours were small and subserous, and could hardly have exerted such a malign influence as to predispose to the graver disease, especially in view of the fact that the cancerous growth was cervical in each case, and in an advanced stage in subjects who had reached the menopause.

Degenerations of the tumours.—Retrogressive changes—calcareous, myxomatous, cystic and red degenerations—were present in 14 cases. Considering the apparent age of the tumours in a large majority of my cases it would seem that these changes were comparatively rare. Calcification of the tumour was observed in 5 patients whose ages ranged between 40 and 55 years. Two of these had reached the menopause. Myxomatous or mucoid degeneration was noted in 6 instances, and occurred in subjects whose ages varied from 23 to 46; red degeneration was discovered in two women, æt. 40 and 42 years respectively. Both were married women; the former was parous, and her last pregnancy, which ended prematurely, occurred 8 years previous to the operation; the latter, who had been married for 19 years, was non-parous. Cystic changes were observed in one case.

While the degeneration of fibroids is usually absent before the age of 40 in cold and temperate climates, this change was observed in 4 of my patients, æt. 23, 28, 32 and 33 years respectively. These various degenerative changes were more frequently associated with the subserous than with other forms. Cases of submucous fibroids which were removed *per vaginam* and had in several instances undergone necrosis are not, of course, included in this series. I have

never yet observed the so-called sarcomatous "degeneration" or "transformation" of fibroids reported by other observers. My experience therefore does not support any pessimism with regard to the danger of malignant changes due to fibroids. I must add, however, that in none of my cases was the tumour subjected to microscopic examination. On the other hand, careful examination of the patients at least two years subsequent to the operation in 93 cases whose after-history I was able to trace did not disclose the slightest sign of malignancy. The rarity of degenerative changes in my series of cases is difficult to explain in view of the fact that although the patients were comparatively young women, the tumours could not be regarded as of recent date in the large majority of the cases. The frequency of multiple growths and the fact that the intramural variety preponderated may have some bearing on this point. The three varieties of fibroids were frequently displayed in the same subject, but one variety usually predominated. The growths were generally multiple; in 31 instances the tumour was solitary. Individually the tumours varied much in size, but the whole mass formed by them often attained considerable dimensions. As many as 67 tumours were counted in one case. The largest tumour among my cases weighed 18 lb. 12 oz. The body of the uterus was usually the seat of the affection; in one case only was the growth purely cervical, and in 12 others cervical fibroids were present in association with corporeal growths. The tumours also varied in texture; some were hard and fibrous, while others were soft and vascular.

In 5 cases the tumour, by its shape, contour and consistency simulated a gravid uterus, necessitating in one case postponement of the operation for two months to establish beyond doubt the diagnosis. To show how closely pregnancy and fibroids simulate each other, sometimes making clinical differentiation difficult, I may refer to the case of a multipara, æt. 40 years, on whom laparotomy had been performed with a view to hysterectomy. After opening the abdomen the operation was discontinued, as there arose in the operator some doubt even at this stage as to the presence of a fœtus in the uterus. Six months later, when the patient came under my care, it was obvious that the case was not one of pregnancy. The tumour was single, soft and rounded, and had undergone red degeneration.

The relation between fibroids and sterility.—This is a very interesting problem, which has not been satisfactorily solved. While the close association between sterility or arrested fertility and fibroids is fully recognised, its nature is not clear. Some observers hold that fibroids cause sterility, others that sterility induces fibroids. Of the 130 cases, 49 were in single and 81 in women who were married or lived as such for long periods. Of the single women 13 were intact; the remaining 36 had apparently been exposed to conception and 8 had borne one child each.

With regard to the 81 women grouped as married 33 were absolutely barren, and the length of marital life varied from 4 to 24 years. The remaining 48 had borne 67 children and had had an aggregate of 52 abortions or miscarriages. There was therefore an average of 2·4 pregnancies to each patient. The average lapse of time between the last pregnancy and the date of the operation was 10·2 years, the longest period being 28 years and the shortest 4 months. It is interesting to record that the last pregnancy in 24 cases terminated in abortion or miscarriage.

Various suggestions have been made to account for the association between fibroids and sterility. Some observers maintain that these tumours arise in default of the normal function of the uterus, namely, pregnancy. This theory, which is based on the supposition that these women ardently long to have children and that their unsatisfied maternal desires keep up a congested condition of the uterus and in some mysterious way produce a myoma, does not commend itself to me. I am inclined on the whole to favour the view which attributes the sterility to the presence of the fibroid. It seems to me that in a large majority of these cases the more or less chronic congestion and unhealthy condition of the endometrium provoked by the tumour, the profuse and repeated hæmorrhages, the frequent association of ovarian and tubal affections and other complications, the mechanical effects of the tumour and the irritation produced by its presence and position are sufficient to explain the sterility or diminished fertility which is coincident with this condition.

Complications after operation.—This refers to more or less immediate sequelæ of the operation.

(1) Abscess: (*a*) Stitch abscesses occurred in 5 of my early cases before I began to adopt the method of skin sterilisation by iodine. I close the abdominal wound in two layers, the peritoneum with continuous catgut sutures and the aponeurosis and skin with interrupted silkworm-gut sutures. The stitches are removed between the 10th and 12th day, and the patient is kept in bed for at least 3 weeks from the date of operation to ensure the firm union of the wound. In no case have I observed ventral hernia or a tendency to this condition as the result of the operation. In one instance the abdominal scar presented a keloidal growth. Keloids, it must be added, are common among the negro race, affecting especially the ears and sometimes developing in cicatrices.

(*b*) Pelvic abscesses occurred in two cases. In the case of an obese woman in whom adhesions complicated the operation a large pelvic abscess developed. In the other the bursting of a pelvic abscess through the wound resulted in a troublesome sinus, which closed only after expulsion of a silk ligature in the discharges.

(2) Pulmonary complications: (*a*) Acute pneumonia occurred in 3 cases 6, 9 and 13 days respectively after the hysterectomy and interfered with the progress of convalescence, but the patients ultimately made good recoveries. (*b*) Pleurisy followed 16 days after the operation in a patient with albuminuria and quickly yielded to treatment. (*c*) Bronchitis developed in one case two days after the operation. The attack was a mild one and did not disturb the course of convalescence.

(3) Intestinal sequelæ: (*a*) Jaundice was observed in one case 8 days after the operation and gave rise to little trouble. (*b*) Dysentery occurred in one case a week after the operation, and although it was amenable to emetine it retarded convalescence by its debilitating effects. (*c*) Colitis, a very common disease in this colony, followed in one case. It was probably the recrudescence of an old complaint.

(4) Localised purulent peritonitis occurred in a case in which a large swab remained in the peritoneal cavity. Six days after the operation a copious amount of pus was discharged through the abdominal incision. The wound was re-opened and the foreign body removed. Complete recovery followed a long and tedious convalescence.

(5) Intestinal obstruction resulted in 2 cases. In one this serious sequela showed itself $4\frac{3}{4}$ years after the operation in a patient in whom the tumour was involved in numerous dense adhesions. On reopening the abdomen a band constricting the small intestine was excised with a successful result. The patient was seen $2\frac{1}{2}$ years later, and was in good health. In the other case the condition occurred 10 months after the operation. Here the hysterectomy was complicated by a large ovarian cyst which had contracted dense adhesions to adjacent structures. Laparotomy revealed gangrene of about 6 in. of the small gut, which was tightly constricted by a band. Enterectomy and an end-to-end anastomosis were successfully performed. The patient was seen $6\frac{3}{4}$ years later, and was in excellent health.

(6) Malarial fever was a rare sequela considering the prevalence of the disease in the colony. It showed itself in 3 cases, and in each case was quickly checked with quinine.

(7) Phlebitis: Five weeks after operation a patient returned with marked swelling of the left leg, which was very tender and painful, the result of phlebitis. Under treatment the pain soon disappeared, but the swelling was slow to resolve.

(8) Angio-neurotic œdema suddenly appeared in a patient 7 days after the operation. It affected both lips, and lasted for a few hours. This patient had been subject to these attacks periodically for many years—the lips, tongue, cheeks, palms of hands and arms being the parts generally affected. The subsequent history showed that the operation exerted no influence whatever on the condition.

(9) The bladder was accidentally incised in a case in which it was spread out over the anterior surface of the tumour, which had been abdominal. The wound was at once sutured, and no ill-results followed.

(10) Galactorrhœa: An abundant milky fluid from both breasts was observed on the 19th post-operative day in a nullipara, æt. 36 years. The secretion was subjected to microscopical examination by the bacteriologist, who reported as follows: "Typical appearance of lacteal fluid under the microscope." This condition persisted for about 3 months, and gradually disappeared. It appears to be a very rare sequela; I have not been able to find a single recorded instance of it.

After-results.—As the patient's recovery does not always imply that the operation has been

successful, I have followed up these cases as far as possible in order to determine the ultimate results, especially in view of the difference of opinion among gynæcologists with regard to the indications for the removal of fibroid tumours—a procedure which not infrequently involves ovariotomy as well. In the 130 cases there were 3 deaths as the immediate result of the operation, giving a primary mortality rate of 2·3 per cent. Death in each case was due to cardiac failure supervening a few hours after operation. In the remaining 127 cases 3 patients are known to have died 2 years, 3 years and 4¼ years respectively after the operation from intercurrent diseases not associated with the operation, namely, acute pericarditis, cancer of the breast, and melancholia. In the last case signs of insanity began to show themselves 16 months after the operation, and 3 years later the patient had to be placed in a lunatic asylum, where she died a month later. At the time of the operation she was 34 years, and both ovaries were conserved. Domestic troubles appear to have played an important part in causing the mental derangement.

I have not been able to obtain the subsequent history of the remaining 124 cases owing to the migratory habits of my patients, most of whom belong to the labouring class, but I have been fortunate enough to trace 93 patients, or 75 per cent. of the total number (124). The observation period after operation ranged between 2 years and 7 years, so that a sufficient time had elapsed to estimate the real result of the operation. Thirty-four patients were examined between 2 years and 3 years after the operation; 36 between 3 years and 5 years; and 23 between 5 years and 7 years. In 29 cases more than one examination was made at long intervals. With regard to the 93 cases that have been traced, the following points may be considered: (1) General health; (2) continuation or cessation of menstruation; (3) artificial menopause; (4) effects on sex instincts; (5) condition of the cervical stump.

As the cases in my series fall into 3 distinct groups, it is necessary to consider the after-effects in each group. In the first group hysterectomy was performed with conservation of the ovaries; in the second one ovary was removed; and in the third both ovaries were extirpated with the uterus. The after-results of the cases in each group may be tabulated as follows:

	Hysterectomy with conservation of both ovaries.	Hysterectomy with removal of one ovary.	Hysterectomy with removal of both ovaries.	Total.
Number of cases operated upon	57	51	22	130
Number of cases traced (omitting 6 who died)	42	36	15	93
I. General health:				
(*a*) Very good	31	28	12	71
(*b*) Moderate	8	5	3	16
(*c*) Poor	3	3	—	6
II. Menstruation:				
(*a*) Continued	20	7	—	27
(*b*) Ceased	22	29	*15	66
III. Artificial menopause:				
(1) Symptoms absent	21	15	*5	41
(2) Symptoms present	21	21	10	52
(*a*) Heat flushes	18	17	10	45
(*b*) Headache, giddiness, faintness	4	4	2	10
(*c*) Impairment of memory	6	4	1	11
(*d*) Depression and irritability	4	3	1	8
(*e*) Profuse perspiration	10	5	3	18
IV. Effect on the sex instincts:				
(*a*) Unaltered	28	19	8	55
(*b*) Increased	3	5	—	8
(*c*) Diminished	7	7	6	20
(*d*) Abolished	2	1	—	3
(*e*) Absent (always)	2	4	1	7
V. Condition of cervical stump:				
(*a*) Normal	42	35	16	93

(1) General health: Seventy-one patients expressed themselves as being in excellent health; 16 reported that they were in moderately or fairly good health, but felt better than before the operation, and were able to resume their work without discomfort; while 6 stated that their health was poor and no better than before the operation, the cause of ill-health being chronic colitis, aneurysm of the abdominal aorta, cerebral hæmorrhage followed by hemiplegia, incontinence of urine, pain in the abdomen, and general debility. Some patients showed a tendency to obesity, others lost flesh, while the majority exhibited no apparent change. Three patients got married after the operation.

(2) Menstruation: Of the 93 cases followed up, 2 had reached the menopause at the time of th operation. Excluding these 2, menstruation hac ceased in 64 cases, and in the remaining 27 subjects there was a periodic sanguineous discharge, which

* This includes two cases which had reached the menopause at the time of the operation.

was generally scanty and of short duration except in 2 cases to be referred to later. The continuation of menstruation in all these cases was no doubt due to a portion of the corporeal endometrium having been left behind, and it appeared to me that this condition produced a beneficial mental effect, while the cessation of the flow exercised in some cases a depressing influence. According to available data the first flow was noticed in from 1 month to 8 months after the operation. In 8 cases the menses appeared only once or twice, while in 5 others they recurred regularly for periods varying from 3 months to 1 year. Two of the patients who were examined 4 years after the operation were still quite regular, with no change either in their habit or type of menstruation.

(3) Menopausal symptoms were observed in 52 patients. Heat-flushes occurred in 45 cases, and followed between 1 month and 7 years after the operation in patients between the ages of 27 and 47 years. These symptoms lasted generally for a rather prolonged period, varying from 4 months to 7 years, but apparently they were never severe. It is interesting to note that 18 patients reported the association of profuse and troublesome perspiration with the heat-flushes. Headache, giddiness and faintness were complained of in 10 instances, and memory appeared to have been impaired in 11 cases. Some patients manifested a change in disposition and gave way to irritability and depression. While removal of both ovaries exerted a distinct influence on the onset of menopausal symptoms, as might be expected, there were certain anomalies. For example, in 3 young women, æt. 27, 28 and 36 years, these symptoms appeared 1 year, 3 months and 1 month respectively after the operation although both ovaries were conserved in each case. It might appear that in these cases the removal of the tubes interfered with the ovarian circulation, causing atrophy of the ovary and loss of function. On the other hand, a patient, æt. 32 years, in whom both ovaries were removed, showed no menopausal symptoms, although 5 years had elapsed since the date of the operation. Another patient, aged 27 years, on whom double oöphorectomy had also been performed in combination with the removal of the uterus, showed no symptoms of an artificial menopause at the time of the examination two years after the operation. In yet another patient, æt. 33 years, it was only after a lapse of 7 years that menopausal symptoms manifested themselves. The remarkable delay in the onset of the artificial menopause in these cases may have been due to a portion of the ovary having been left behind, although I am not conscious of the fact.

(4) Effects on sexual instincts: One of the difficulties of investigating this question is the reluctance of most patients to speak, so that there is always an element of doubt as to the correctness of the information given. According to my notes in 55 cases no difference in the sexual appetite was observed by the patient after operation; in 8 it was increased; in 20 it was diminished; in 3 it disappeared; and in 7 it had never been present.

The following table is of special interest:

Cases traced in which hysterectomy with double oöphorectomy was performed.

No.	Age.	Single or married.	Parous or non-parous.	Effect on sex instinct.
1	35	S.	Non-parous	Diminished
5	35	M.	,,	Unaltered
19	33	M.	Parous	,,
43	29	S.	Non-parous	Never present
45	32	S.	,,	Unaltered
57	50	M.	Parous	,,
65	35	S.	Non-parous	,,
86	40	M	Parous	Diminished
87	32	S.	,,	,,
99	32	M.	,,	,,
103	36	M.	,,	Unaltered
108	28	M.	,,	Diminished
120	27	M.	,,	Unaltered
124	55	M.	,,	Diminished
130	38	M.	,,	Unaltered

This analysis shows that of 15 patients on whom double oöphorectomy was performed with removal of the uterus, 8 showed no change in the sexual desire, while 6 others showed a diminution but no loss of this instinct. In one case the sexual instinct had never been present. It would appear therefore that the impulse to sexual intercourse cannot be entirely dependent on the ovary, for while the persistence of the sexual instinct in some instances may be explained on the assumption that a portion of the ovary had been inadvertently left behind, it is most unlikely that this experience is valid in every case.

Among 78 patients in whom at least one ovary was spared it was noted that in 47 cases the sexual attribute was unaffected, in 8 it was increased,

in 14 it was weakened and in 3 it was lost. The increase of the sexual appetite in these cases is not easy of explanation, especially as the condition was observed not only among married women—parous and non-parous—between the ages of 25 and 50 years, but also in a virgin, æt. 28 years, as the following table shows:

No.	Age.	Single or married.	Parous or non-parous.	Sex instinct.
3	39	M.	Parous	Increased
11	27	M.	Non-parous	,,
69	41	M.	Parous	,,
93	47	M.	Non-parous	,,
106	42	M.	,,	,,
*113	28	S.	,,	,,
114	43	S.	Parous	,,
116	40	M.	,,	,,

A more minute analysis shows that the proportion of cases in which there was no alteration of sexual instincts was more or less the same whether the ovaries were conserved or not, and that while there was no increase or total abrogation of the sexual proclivities among those on whom double oöphorectomy was performed, the number of cases in which there was a diminution of sex instincts was proportionately much larger, among those in whom both ovaries were removed than among those in whom one or both ovaries were spared.

(5) *Condition of the cervix.*—Examination of the cervix in the 93 cases that were traced showed nothing abnormal. An important feature disclosed by the examination of these cases was the complete absence of malignancy of the cervical stump. These results do not lend support to the fear expressed by some authors of malignant disease developing in that part after operation.

Leucorrhœa was noticed in 18 patients, and atrophy of the vagina, of which no special note was made at the time of examination, occurred in some instances. In one case sexual intercourse became painful apparently through atrophic changes in the vagina.

In looking back on these cases what strikes one most is the great benefit from the operation. Seventy-one patients or 76 per cent. of those whose subsequent history I was able to trace were in excellent health, and as many as 93 per cent. were better than before the operation and able to pursue their daily vocations, which often meant arduous work seeing that the majority of them belonged to the labouring class. Although it is impossible to say positively what have been the ultimate results in the 31 cases which have not been reported, I think it may safely be assumed that these patients have benefited as much as those who have been traced, or at any rate that they have not suffered from any great inconvenience, otherwise they would certainly have returned for advice and treatment.

There is no more fascinating subject in gynæcology than fibroids of the uterus. It is of great practical as well as of academic interest. The mystery involved in the origin and life-history of these tumours, the various symptoms, complications and degenerations associated with their growth; the dangers inherent in their natural course, their sinister influence on conception, pregnancy and parturition; their relation to sterility and the menopause; the indications and contra-indications for their removal; and finally the ultimate results of the operation, are questions of the deepest interest to the gynæcologist. I cannot conclude this contribution to the study of uterine fibroids without quoting the words of Sir John Bland Sutton, whose writings on this subject have been a great incentive to me to labour in this field of surgery:

"Hysterectomy for fibroids is unrivalled among surgical procedures for its ability to amend invalid women by thousands; it enables them to lead useful lives, and, if married, to be companions to their husbands. In this sense it is one of the most beneficent operations in the whole range of surgery."

* A virgo intacta.

The Treatment of Obstinate Hiccough.—Venegas has promptly relieved some cases by compression of the diaphragm. The patient lies supine, and flexes the legs and then the thighs to the extreme on the abdomen. This pushes up the contents of the abdomen. The position should be maintained for 10 minutes at least, or until the spasm of the diaphragm has relaxed. The measure can be repeated if the hiccough returns. —*Journ. Amer. Med. Assoc.*, p. 948.

ACTIVE TREATMENT IN URÆMIA.

By J. RUPERT COLLINS, M.A., M.D.(Dubl.), M.R.C.P.(Lond.),
Physician to the General Hospital, Cheltenham; Consulting Physician to the Children's Hospital, Cheltenham.

THERE is still a mystery about the causation of uræmia. The theories usually advanced to explain it are: (1) the presence of some poison due to the retention of the ordinary urinary products in the body; and (2) the formation of a toxin from morbid tissue metabolism. It has also been put forward that the degeneration of kidney substance may set free nephrolysins, which act as tissue poisons. However, notwithstanding laborious investigation for many years, the exact nature of the uræmic poison still proves an *ignis fatuus* in the fields of chemical research.

Uræmia has been classified in different ways according to its onset, whether acute or chronic, or according to the system of the body most affected —nervous, digestive, respiratory, etc.

But clinically I think uræmia may be usefully considered as it affects (1) the young, (2) those over middle age.

In the young adult uræmia is usually of sudden onset and not infrequently follows a drinking bout. In most of the cases I have seen the patient was of powerful physique. The chief symptoms are severe headache, fits, attended sometimes with maniacal violence, and persistent vomiting. The nature of the case often escapes notice, and I have had patients sent in with the diagnosis of bronchitis, asthma, epilepsy, cerebral tumour, apoplexy. Yet the general appearance of the patient is very characteristic. The breathlessness without sufficient physical signs in the chest to account for it, accentuated second sound of the heart with the apex beat displaced outwards, high tension pulse, a dirty mouth, with offensive odour from the breath; and usually a certain amount of œdema, go to make up a picture to be completed by the finding of albumin and tube casts in a diminished urinary output. If the retinæ be examined there will be found turgid veins and small silver wire arteries, with possibly the retinal hæmorrhages or white areas of atrophy characteristic of albuminuric retinitis. If the latter be present the prognosis is more grave, as few cases live more than eighteen months after well-marked albuminuric retinitis has taken place. The importance, therefore, of examining the fundus in these cases is very great. The case I will now describe depicts how some pitfalls in the diagnosis of these cases may be avoided, and also how prompt and vigorous treatment is successful even when the attack of uræmia is severe.

On September 12th, 1908, I was asked by Dr. Dighton to see a Mr. H. T—, æt. 24 years, who was quite unconscious. The patient had rheumatic fever four years previously and had since had a damaged heart. On September 3rd he had a fall from his bicycle and bruised his right leg and forehead. On September 10th he felt poorly and on the next day he sent for Dr. Dighton. His temperature was then 103° F. There was a history of drinking and of exposure to cold and wet. When I saw him he was unconscious, very restless, muttering, and forcibly resented my examining him. He persisted in throwing off the bed-clothes, jumping up and down, and talking all the time in an incoherent way. The pupils were equal and small. There was no retinitis. There was no evidence of any septic trouble. About 12 oz. of urine were passed in the 24 hours; it contained a little albumin, a few hyaline and granular tube casts, and 4·7 per cent. of urea. The diagnosis of uræmia was made, but it was important before adopting active treatment to exclude all question of meningitis, subdural hæmorrhage, or cerebral abscess, as the patient had shortly before had a fall on his head.

Accordingly I made a lumbar puncture, and 5 c.c. of cerebro-spinal fluid came away. The fluid was quite clear, had no tinge of blood, and was found to contain no leucocytes. An examination of the blood showed no leucocytosis to be present. We could then regard meningitis and cerebral abscess as excluded, and subdural hæmorrhage to be very unlikely. Half a pint of blood was removed by venesection, and active purging and diaphoresis were carried out. Next morning the patient was quite sensible and steadily improved to recovery. The blood removed contained 2 per cent. of urea. Ten months later the patient had a similar attack, but of a milder nature, which was treated in the same way with success.

The next three cases I will describe occurred amongst soldiers. For over three years I had

charge of the medical division of a large base hospital in France. Out of the very large number of patients who passed through my hands I saw only twelve cases of uræmia. Two of these died within twelve hours of admission, the others recovered. Some of those who recovered were so ill that it seemed to my brother officers and myself to be almost impossible that they should recover. As the result of experience with these cases I came very definitely to two conclusions: (1) As soon as uræmia is diagnosed the most active treatment should be adopted along the lines I shall indicate. (2) The prognosis if this be done is very favourable in young adults.

Driver A. D— was admitted to hospital August 22nd, 1917, with the history that he had not felt well for some days previously. On admission he was very drowsy, his face was swollen and there was slight œdema of the legs. There were no moist sounds present in the lungs; the tongue was furred. It was thought necessary to put him on the "dangerously ill" list at once. He had a series of convulsions from noon to 7.0 p.m. Lumbar puncture was done an hour after admission, but did not ease him very much. Calomel gr. 5 with pulv. jalapæ co. gr. 30 were given at once and a diuretic mixture every three hours. He continued to be sick and to have one fit after another. At 3.0 p.m. he was given morphia gr. ¼. This produced no apparent effect, and at 7.30 p.m. I removed 20 oz. of blood. The patient became much quieter after the venesection and went to sleep. The following day he was quite conscious and much improved. During the first 24 hours he passed only 1 oz. of urine, which contained a large amount of albumin, but no tube casts. The patient improved steadily under treatment with purgatives and diuretics, and on September 2nd, 1917, there was only a light cloud of albumin in the urine. Examination of the eyes showed thickening of the retinal arteries, but otherwise the fundi were normal.

Pte. E. W. H— was admitted to hospital on November 4th, 1918, with the history that he had been admitted to a field ambulance on October 28th, 1918.

F. A. notes were: "Pleural effusion left base, albuminuria marked, spacing of cardiac sounds."

He was transferred to a C.C.S. five days later, and the C.C.S. notes state: "Slight dulness of left base with distant breath sounds. Face swollen, shortness of breath, swelling round the eyes. Pain in left side, marked dulness of left base with diminished breath sounds and absence of vocal resonance. Blood pressure raised, urine contains blood and a large amount of albumin. No retinitis."

When he arrived at the general hospital his effusion had cleared up, but coarse *râles* were present over both bases. He had severe dyspnœa and the pulse was feeble. He was put on purgatives and diuretics, but did not improve, and he began to have uræmic fits. One pint of blood was removed. He was decidedly better the next day and had no more convulsions. He continued to improve under hot-air baths and diuretics, and was evacuated to England free from symptoms except for a cloud of albumin in the urine.

Pte. W. D—was admitted to hospital on September 18th, 1917. He stated that he had been subject to headaches for three months. A week ago he became short of breath, and two days before his admission his feet began to swell.

When admitted, he was suffering from severe dyspnœa, moist sounds were present over the bases of both lungs, and the apex beat of the heart was an inch outside the nipple line. His legs and back were œdematous.

He was at once put on cathartics and diuretics. The following day he had a convulsion at 6 p.m. and he continued to have fits at intervals for three hours. Morphia gr. ¼ was given and he became easier. On the next morning he was worse, his pulse was poor and he was more dyspnœic. I abstracted 10 ounces of blood and gave him a hot-air bath. The air bath was made by means of a stretcher on trestles, and fracture cradles on the stretcher, the whole being covered with blankets, and heated from below by three Beatrice oil stoves.

He improved almost at once, and the following day his urinary output had risen from five ounces for the twenty-four hours to twenty-five. He continued to improve and made a good recovery.

As soon as a definite diagnosis of uræmia is arrived at, I think the following course of treatment should be adopted. Remove by venesection 10 to 20 ounces of blood, give a strong purgative, such as pulv. jalapæ co. gr. 30, followed by a strong saline purge in six hours' time.

If the patient is having convulsions, remove by lumbar puncture 10 to 20 c.c. of cerebro-spinal

fluid, according to the pressure present. A diuretic medicine should be given four-hourly. An occasional cup of tea during the day is much appreciated and is beneficial. The patient should be encouraged to drink freely of some bland fluid, such as imperial drink, lemonade, barley water, milk and water.

A hot-air bath should be given once a day, and usually some make-shift arrangement can be made to give such. Electric bulbs from a radiator placed in the bed is the most convenient form. But a metal funnel inverted over a lamp and with a metal tube leading from the funnel into the bed serves well, or if a stretcher is available, arrangements can be made as described previously. A hypodermic injection of morphia does no harm and is useful if the patient is restless; but it will be usually found that after a lumbar puncture and venesection even a violent case becomes quiet and goes to sleep—in fact, the good effect is sometimes dramatic.

We have now to consider the next class of patient—those past middle age. Here we do not meet with the same success in treatment, and we are restrained from employing as drastic methods. I will briefly describe 3 cases:

Mrs. G. was admitted under my care to the Cheltenham General Hospital on April 12th, 1914. She was a big, plethoric woman, æt. 51 years. She gave a history of severe headaches off and on for about a year. Her tongue was furred and her breath was foul. The right side of her face twitched spasmodically, and she spoke slowly and with some mental confusion. Her pulse rate was 90 beats to the minute and of high tension. Examination of the retinæ showed arterial sclerosis but no retinitis. A lumbar puncture was done and 20 c.c. of cerebro-spinal fluid removed. She was passing about 8 ounces of urine in the day, and albumin with tube casts were present. She was also given purgatives and diuretics. She made steady improvement and was discharged from the hospital feeling quite well on May 20th.

This case represents a common type of the gradual onset of uræmic symptoms. In such cases a good result may be looked for if treatment is begun in time.

I will now mention two cases very similar, in which the actual illness was so sudden and so soon fatal as to give little opportunity for treatment. In February, 1914, I was asked by Dr. Braine-Hartnell to see an old gentleman, æt. 70 years, who was unconscious. He was a wealthy man, and had always done himself well and lived an active life. He was about as usual on the day of his illness. In the evening he complained of feeling sick, vomited, and then became very breathless. In an hour's time he was unconscious, and he died within 10 hours of the onset of his symptoms.

The other case was very similar and occurred a month later: A gentleman, æt. 78 years, had, as was his custom, driven out to see the hunt on a cold day in March. He went to bed at his usual time. His wife then noticed that he was very breathless, and he began to vomit. He rapidly became unconscious, and died in 6 hours from the onset of the illness. In both cases I considered the advisability of venesection and refrained, as when I saw them, in each case the pulse was feeble, and, in fact, the patient was moribund. I am not sure, however, that even in such cases it would not be worth while to try the effect of venesection. The various drugs I tried—morphia, pituitary extract, amyl nitrite, oxygen—proved useless.

If you see a patient suffering with dyspnœa and do not find in the heart or lungs sufficient to account for the dyspnœa, suspect the presence of uræmia. If a complete examination of the case proves that uræmia is present, give thorough treatment on the lines mentioned above and give it at once.

Removal of Foreign Bodies by Transillumination.—A. G. Bettman refers to the difficulty often encountered in removing foreign bodies from the tissues, even when radiograms are at hand or radioscopy has been done. By transillumination any foreign body that will cast a shadow may be located in a surprisingly short time. Having cut down to the supposed location and arranged the light, the operator looks through a tube at the tissues, which may be held up or otherwise manipulated. A dark room is unnecessary. Once located removal of the foreign body is simple. The tube may be of any suitable material, brass or other metal, or a darkened test-tube. In an emergency a roll of paper may be used. The angle at which the tube is used may be varied to meet conditions. Even a deeply embedded body may be located without putting the end of the tube in the wound.—*Journ. Amer. Med. Assoc.*, p. 766.

TWO CASES OF INTESTINAL GROWTH ASSOCIATED WITH ULCERATION.

By JAMES PHILLIPS, F.R.C.S.Ed.,
Hon. Surgeon, Bradford Royal Infirmary.

CASE 1: *Stercoral Ulcer of Cæcum.*—Miss M—, æt. 58 years, was admitted to Bradford Royal Infirmary on October 29th, 1918, suffering from severe abdominal pain of 9 days' duration. The patient had suffered for a year or two from epigastric pain, which came on directly after a meal, and from constipation. Otherwise she was well until the onset of the pain, since when there had been no action of the bowels and the abdomen had gradually become more and more distended. There had been nausea but no vomiting. The abdomen was distended and tympanitic and very tense in its lower half. No visible peristalsis. Nothing felt *per rectum*. The abdomen was opened to the right of the middle line. Small intestine moderately distended. Large number of stony hard calcareous nodules in omentum and mesentery. The lower abdomen was occupied by a tense, cystic swelling, which proved to be the cæcum distended to the size of a child's head. It was partially delivered and a Paul's tube tied in. Several black patches—gangrenous ulcers which had not actually perforated—on its surface were covered in with catgut sutures. There was a moderate degree of distension of the transverse colon. The patient's condition did not warrant a prolonged search for the exact cause of the obstruction, which was presumably either a growth, or adhesions in the lower part of the large bowel. The patient did well, and preferred to go home with the cæcostomy opening as it was rather than submit to an attempt to remove the cause of the obstruction.

CASE 2: *Perforation of Growth of Small Bowel.*—Mrs. C—, æt. 50 years, was admitted to Bradford Royal Infirmary on March 6th, 1919, suffering from acute abdominal pain. For about 6 months she had suffered from attacks of pain in the left upper abdomen immediately after food: there was constipation but no vomiting. The attacks were relieved by stomachics, but returned after a few days. There was some loss of weight. The last attack of pain had come on 3 days before admission and was more severe than any she had had before. It had got steadily worse, and for the last 12 hours there had been repeated vomiting. The bowels had acted each day. There was a little abdominal distension; respiratory abdominal movement was limited but not absent. Tenderness was marked immediately to the left of the umbilicus. The abdomen was opened by a paramedian incision. On pulling aside the transverse colon lymph was found on the small bowel. The appendix was found to be normal. Further examination exposed a growth of the small intestine—fairly high up in the jejunum—with a tiny (pin's-head) perforation surrounded by lymph. There were a good many glands in the mesentery, which was puckered and indurated. A piece of bowel 10 in. long and its mesentery were removed and a lateral anastomosis made. The tumour was apparently a carcinomatous ulcer extending three-quarters of the way round the bowel; at its periphery the growth was ⅜ in. thick, and it shelved towards the centre, where the perforation had taken place. The patient made an uneventful recovery and went home on March 21st, 1919.

REMARKS.

These two cases are recorded because they illustrate well the contrast between ulceration associated with intestinal growth according to whether the growth is situated in the large or in the small bowel.

Perforation of the growth itself is practically unknown in the large bowel. Case 1 is typical of the kind of ulceration found in cases of chronic obstruction about the sigmoid colon. There is a gradual distension of the large bowel above the growth, the cæcum in particular becomes distended, and if relief is not obtained by yielding of the ileocæcal valve and distension of the small gut and consequent vomiting, etc., stercoral ulceration, which is really local gangrene, of the cæcal wall is likely to result. Had operation been delayed in the case recorded the ulcers must inevitably have perforated and a rapidly fatal peritonitis resulted.

Case 2 is a much rarer condition. Growths of the small bowel are uncommon (Sir Berkeley Moynihan in the last edition of his 'Abdominal Operations' says he has operated on only 5 cases),

and when they are met with usually tend to be polypoid rather than ulcerating. And yet one cannot help thinking that probably ulcerating growths of the small bowel are less uncommon than the literature suggests. In addition to the case recorded here I have had another case of perforation of growth of the jejunum ('Brit. Med. Journ.,' vol. ii, 1913), and still another case was recorded in the same volume by Mr. Bolton Carter, of Leicester.

The diagnosis of growth of the small bowel in most cases is well-nigh impossible to make before perforation takes place; then, of course, operation for what is obviously an abdominal catastrophe will clear up the diagnosis.

Serous Expectoration on Aspiration of a Pleural Effusion.—In 1879 Korach observed the following case, but deferred publication till he could confirm his interpretation. A married woman, æt. 45 years, had left pleurisy. Six weeks later she was admitted to hospital with high fever and great displacement of the heart to the right. Fluid was demonstrable in the left pleural cavity up to the third rib in front and to the spine of the scapula behind. As dyspnœa was severe, a cannula was inserted and, without aspiration, 1500 c.c. of slightly cloudy, yellow, serous fluid were drawn off in the course of 40 minutes. When 500 c.c. had been withdrawn, violent coughing set in, necessitating temporary removal of the cannula. The cough was at first dry, but after the cannula was withdrawn, bright yellow, frothy, serous fluid was coughed up, resembling the fluid withdrawn through the chest wall. While the remaining 1000 c.c. of pleural fluid were running through the cannula tracheal râles were audible, and many coarse, bubbling râles could be heard over the left lung. Over the right lung the respiratory sounds were dry and harsh. As the râles over the left lung diminished, the expectoration also dwindled, and the patient, who had been very dyspnœic and cyanosed during the operation, rallied. The pulse, which had been 76 before the operation, increased to 140 and became very soft while the symptoms were severe. Eight hours after the operation, cough and expectoration had ceased. There was no sign of a pneumothorax, and the expectoration of fluid was not accompanied by any demonstrable decrease in the fluid in the pleural cavity. Immediately after the operation the left lung showed little sign of re-expansion, but gradually, with increasing diuresis, the effusion was absorbed.

Korach subsequently performed about 1200 thoracenteses, but only twice found sero-albuminous expectoration. He attributes this immunity to terminating the operation as soon as distressing cough is provoked. In all his 3 cases he omitted this precaution. According to Appel this complication is due either to œdema or perforation of the lung fluid escaping out of the pleural cavity into the lung through a valvular opening in the visceral pleura, which does not allow air to pass the other way. Korach does not accept the latter explanation, but considers that the relief of compression induces a sudden flow of blood to the lung, the vessels of which have become abnormally permeable from prolonged compression. Hence much serum escapes into the alveoli.

Were the expectorated fluid directly derived from the pleural cavity, through a lesion in the visceral pleura, the composition of aspirated and expectorated fluid would be identical. This was, indeed, so in a case recorded, but in Korach's case the s. g. of the sputum was 1024; of the aspirated fluid 1020. The sputum contained 4·2 per cent. of albumin; the aspirated fluid 3·5 per cent. Korach regards cough during aspiration as the first sign of active hyperæmia of a lung long compressed, into which air and blood have suddenly rushed. The first effect of the withdrawal of fluid is migration of displaced organs—heart, mediastinum and diaphragm—to the space evacuated. The lung expands, or attempts to do so, while blood is entering it and inspiratory efforts are made. Obstacles to expansion, such as pain, adhesions, etc., check the entry of air into the alveoli, which become filled with fluid instead. During aspiration the onset of cough coincides with the development of moist râles where previously only weak and distant breath sounds were heard.

The rarity of this complication is largely due to thoracentesis usually being undertaken soon after the lung has collapsed. The longer the collapse, the greater the loss of elasticity and increase of permeability of the pulmonary blood-vessels. In addition to slow withdrawal of a pleural effusion, a valuable precaution against this pulmonary œdema, which has proved fatal in some cases, is to replace the aspirated fluid with gas. This enables all the fluid to be removed at one sitting, without testing the lung's capacity for re-expansion too severely.—*Berlin Klin. Woch.*, p. 412.

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Editorial correspondence should be addressed to the Editor, 18, *Brownswood Park, London, N* 4; *business communications to the Publishers*, 23, *Bartholomew Close, London, E.C.* 1. *Telephone, City* 956.

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THE MENINGITIC FORM OF ACUTE POLIOMYELITIS.

By F. JOHN POYNTON, M.D., F.R.C.P.Lond.,

Physician to University College Hospital and the Hospital for Sick Children, Great Ormond Street.

THE three cases upon which this article is based, though presenting no features which have not been previously commented upon by writers, may be of some interest to those who have few opportunities of studying poliomyelitis. It is well recognised that the onset of that disease resembles that of an acute fever, and the destructive results it produces are, unfortunately, too frequent to be forgotten. It is possible, however, that some are not aware of the different types of the onset, and here Winckman's classification is followed, who distinguishes:

(1) The spinal form.
(2) The bulbar, pontine, and mid-brain form.
(3) The cerebral.
(4) The cerebellar.
(5) The meningitic.
(6) The neuritic.
(7) The abortive.

We are not to suppose that these are sharply delineated from one another, but they serve the useful purpose of fixing in our memories facts which become of great value when dealing with the difficulties of diagnosis.

The three cases recorded here fall into the group of the meningitic type, which is undoubtedly the most puzzling variety. The late Dr. Batten, in his valuable Lumleian lectures on poliomyelitis in 1916, writes thus of this group: "The onset may be sudden, attended by convulsions and coma. This may rapidly pass off or persist and deepen. Temperature is raised, and may remain high for days. The neck is stiff and the legs rigid, in a flexed or extended position, and Kernig's sign

may be present. The pulse is slow or rapid according to the stage of the disease. All the symptoms of a meningitis may be present, and on lumbar puncture the cerebro-spinal fluid escapes under pressure, is clear, and on cytological examination may be found to contain an increased number of lymphocytic cells, a normal or sometimes a diminished sugar reaction, and increased amount of albumen."

CASE 1.—R. W—, a male, æt. 1½ years, in the middle of the night of July 3rd was suddenly seized with an illness, which began with a cry, followed by a convulsion and unconsciousness, which lasted for over half an hour. On the 4th he vomited, was in severe pain, and was unable to stand or use his left arm. He was admitted to the hospital on the 7th. The temperature was then 99° F., and remained normal throughout his stay. The pulse-rate was 96 per minute. He complained of pain in his eyes, there was photophobia and much pain on movement, particularly of the neck and affected limbs. The neck was held rigid. There were no cranial palsies and no optic neuritis. Six c.c. of cerebro-spinal fluid were withdrawn and was clear. There was no clot, and only slight reduction with Fehling's solution. The cell-count showed 15–20 per c.mm., consisting of both mono- and polynuclear leucocytes. The Wassermann reaction was negative. For this investigation I was indebted to Dr. Greenfield, Pathologist to the National Hospital, Queen Square.

The aspect of the case was suggestive of meningitis, but there was a flaccid paralysis of the left arm that affected the deltoid, spinati, biceps and supinator longus in particular. The left leg was damaged to a lesser degree, and the child could support its weight but would not attempt to walk.

The triceps jerk was lost on the left side; otherwise the reflexes were obtained.

The pain gradually passed away by the end of the month, and on August 6th the child could stand and walk without assistance. He was discharged, fitted with a Fairbank's splint, to have the remainder of his treatment in the Massage Department.

CASE 2.—This case is still under observation in the hospital. A boy, æt. 4½ years, complained of headache and general illness on August 2nd, and these symptoms increased in severity almost to the point of coma. On the 5th he lost the use of his left leg with severe pain, and later all the limbs and the neck were tender, and he screamed at the slightest attempts at movement. There was no cranial nerve paralysis or optic neuritis. The neck was held rigid.

On admission the temperature was 100° F.; pulse 120 per minute; respirations 36. The abdominal reflexes were not obtained, and though the right knee-jerk was obtained on the 7th both had disappeared by the 8th. The reflexes of the upper extremities were not obtained. Any attempt at handling the extremities caused great pain.

The cerebro-spinal fluid was clear with no clot. Albumen ·05 by Aufrecht. Good immediate reduction with Fehling. Cell count 100–110 per c.mm., consisting of both mono- and polynuclear leucocytes. Tubercle bacilli were not found. The Wassermann reaction was negative. For these data I am indebted to Dr. Nabarro, Bacteriologist to the Hospital.

While under treatment with hexamine he developed blood and albumen in the urine—to be attributed in all probability to the irritation of the drug, for it ceased on the substitution of citrate of potash.

Weakness and wasting of the muscles of the shoulder girdle and of the thighs and legs are now visible, and 6 weeks later there was still pain on sudden movement of the arms or legs. Yet the improvement has been great, and the condition, as compared with that on admission, vastly improved.

In the early days the diagnosis from some form of meningitis—particularly cerebro-spinal meningitis—was most difficult, and I would emphasise the diffuse distribution of the early signs.

CASE 3.—This case was fatal and illustrates the progressive character of some of these illnesses.

W. E—, male, æt. 3 years and 8 months, was seized with sudden illness in the middle of the night of August 24th. He was feverish and complained of pain in his throat and in the lower part of the back. The next day he became delirious and then drowsy, remaining thus for 3 days, when he vomited, and his mother noticed that his neck, arms and legs were powerless.

He was admitted to hospital on the 28th. Temperature 100·2° F., pulse 96, respirations 24. Mental condition clear when roused. No paralysis

of cranial nerves. Left arm flaccid, but limited movements of the fingers and wrists and of pronation and supination were elicited. The right deltoid was weak. Supinator reflex present. Triceps jerks not obtained. There was complaint of abdominal pain and the reflexes were not obtained. Good movement of the left leg persisted, but though there was no definite paralysis the right showed very little power except in the flexors of the hip and extensors of the thigh, and the knee-jerk was lost. The spinal fluid was clear. Albumen 0·1 per cent. Autfrecht. Slight reducing action with Fehling's solution. Cell count 5–10 per cent. of mononuclear lymphocytes (Dr. Nabarro).

It was noted soon after admission that the action of the diaphragm was impaired, but the breathing was not noticeably affected. On the 29th a great change for the worse developed. All movements of the diaphragm ceased and the intercostals were also paralysed. The child lingered on breathing with the extraordinary muscles of respiration, until with increasing cyanosis, he lost consciousness and died on the afternoon of the 31st.

The necropsy verified the diagnosis.

I have chosen these three cases because they bring to the memory a group of conditions which must always be a cause of great anxiety and perplexity; a group in which we must include the various forms of meningitis. Every doctor realises that the great fear at the back of his mind is tubercular meningitis. No disease, is so deceptive, and the clinician has hardly a sure test by which he can guide his diagnosis, for the onset, though, as a rule, gradual, may be as abrupt as cerebro-spinal meningitis, and any of the cardinal signs may be in abeyance.

It is but due justice to the skilled bacteriologist to say that he has greatly aided the clinician by his methods, and of this I have recently had a striking example. A very healthy looking boy was admitted into hospital with suspicious symptoms, but looking so well that the diagnosis of tubercular meningitis seemed incredible, but in the cerebro-spinal fluid a few tubercle bacilli were demonstrated, and the course of the case only too rapidly proved the accuracy of his report.

These cases of poliomyelitis are most difficult to differentiate from tubercular meningitis, but grave though the condition is the outlook is far more favourable and the decision a very important one.

The cerebro-spinal fluid may settle the diagnosis, but even this, in the absence of tubercle bacilli, may not be conclusive, for we must remember that in this form of poliomyelitis the character of the fluid varies considerably. When taken early there is, as a rule, an increased cell count with a low globulin content, and the cell increase is in the lymphocytes and large mononuclear cells. In some cases, however, the polynuclear cells predominate. The absence of tubercle bacilli, of meningococci and other bacteria, will certainly suggest to us the possibility of poliomyelitis, and then the clinical signs will probably lead us to the right conclusion. Pain must not mislead us, it is often extreme and persistent. So vivid is the child's recollection of the pain that a certain functional element is introduced prolonging the period during which all effort to move the limb is resented. It is when we find a localised flaccid paralysis with a loss of reflexes that we come on surer ground, particularly for the exclusion of tuber cular meningitis, and when with this the cerebral symptoms clear away and the temperature falls the diagnosis is assured. It is well to remember that an acute poliomyelitis in the cervical region is always associated with rigidity and pain in the neck and often with severe headache, vomiting and delirium. Nearly 20 years ago I published in this JOURNAL a very striking example of this feature under what I believe now to be the mistaken diagnosis of posterior basic meningitis.

Again, when the cervical region of the cord is attacked we must be on the watch for paralysis of the diaphragm for the virus will not need to spread far to implicate this region. In the third fatal case this event followed in a second outburst of the attack.

Complete paralysis is easily recognised by the indrawing of the epigastrium with inspiration. When the intercostal muscles are also paralysed the condition is pitiable. The child lies cyanosed, with widely dilated nostrils, raising the chest by the accessory muscles. Oxygen gives some little relief, and it is indeed remarkable how long life is prolonged. It is when the paralysis is partial that it may be overlooked, but ineffective cough may rouse suspicion, for in order to cough effectually the diaphragm must be steady. If we overlook a partial paralysis we may have serious trouble with lumbar puncture, for in doing this the knees may be pushed up over zealously toward the chin and

the child, lying on its side, have the inspiration so gravely embarassed as to be in extreme danger.

The treatment of these cases in the acute stage is necessarily unsatisfactory, for we have only to study a section of the diseased tissue to realise how fulminating a lesion is present. Hexamine, measures for relieving the pain, and even the injection under the skin of the cerebro-spinal fluid from a case that had recently recovered were all employed in these cases.

The management of the paralysed limbs is a part of the treatment in the chronic stage but it is very advisable that massage should not be attempted until the pain has ceased.

There is one point concerning the reflexes that may give rise to perplexity. When the lesion is high up the virus may spread to the pyramidal tracts at that level. The result would be increased reflexes below and an extensor response. Such a condition of flaccid paralysis in the upper limbs and a spastic paralysis below will recall the chronic condition of amyotrophic lateral sclerosis.

Lastly, it is interesting to note in these cases how often an entire limb may seem to be paralysed except for some movements in the fingers and toes. With recovery much of this widespread loss of power may pass away leaving a comparatively small area of complete destruction.

The Non-infectiousness of Influenzal Pneumonia.—Scheel states that in the summer and autumn of 1918 most of the admissions to the ninth block of the Ullevaal Hospital, Christiania, were cases of influenza and pneumonia. During the autumn epidemic, 99 patients who had suffered from pneumonia were discharged, having been attended by nurses without masks or other contrivances against infection. They had been coughed on daily by patients, some of whom were delirious. The age of the nurses was that in which influenzal pneumonia is most common. Yet only one, of 19 who contracted influenza, developed pneumonia.—*Norsk Mag. for Laegevidens.*, p. 190.

A CASE OF SPINAL MENINGEAL TUMOUR.

THE PRACTICAL IMPORTANCE OF EARLY DIAGNOSIS.

By R. T. WILLIAMSON, M.D., F.R.C.P.,
Consulting Physician to the Royal Infirmary, Manchester.

THE case which I desire to describe is that of a man, æt. 45 years, who came to the medical out-patient room complaining of "pain in the stomach." The patients to be seen in the out-patient room were at that time very numerous, and in most cases only a very short examination was possible. But fortunately the man was not dismissed as a case of dyspepsia. The pain was not related to food, and most of the common causes of abdominal pain could be dismissed. It had not the characters of gall-stones or renal or intestinal colic. It was more or less persistent. Lead colic, the pain of the gastric crises and the girdle pains of tabes, and appendicitis could be excluded. On careful inquiry it was evident that the pain was of a girdle character, below the umbilicus, and chiefly just above the groins; and the patient informed us that it had troubled him on the left side for 6 months, and during the last 3 months it had been on both sides. The pain corresponded in its characters to the girdle pain from compression of nerve-roots which is associated with many spinal cord diseases. The patient was, however, able to walk quite well: no paresis, and, tested roughly with the finger, no anæsthesia could be detected; and no indication of spinal affection could then be discovered, except a Babinski reflex on each side. The patient was sent into hospital for further and more detailed examination, with a probable diagnosis of compression of spinal nerve-roots and possibly very slight compression of the spinal cord. After a few days, on careful examination, an area of diminished cutaneous sensation was detected in the distribution of the twelfth dorsal and first and second lumbar nerve-roots (in the region of the girdle pain in the lower part of the abdomen and on the upper part of the thighs). The temperature sensation was found to be affected on the left leg. Shortly afterwards the sensation for pain was also found to be affected on the left leg.

Briefly this is the outline of the symptoms.

The following are the more detailed notes of the case.

Previous History.

The patient had suffered from abdominal pain of a girdle character for 3 months. For 3 months previous to this he had suffered from a pain on the left side only.

The pain was at the lower part of the abdomen, from the iliac bones to the pubes, chiefly just above the groins. No difficulty in walking and no other symptoms had been noted. No history of injury, syphilis or alcoholism.

Present State.

(A few days after admission to hospital.) External surface normal; no spinal curvature; no enlarged glands; no indication of tumour in other parts of the body; no cachexia.

Nervous System.

Motor.—No paralysis or paresis, no wasting of muscles. The patient can walk quite well and perform all movements of limbs. Bladder and rectum not affected. Reflexes: Knee-jerks normal; no ankle clonus; Babinski (extensor) plantar reflex on each side; no Oppenheim reflex; epigastric, abdominal and cremasteric reflexes not obtained.

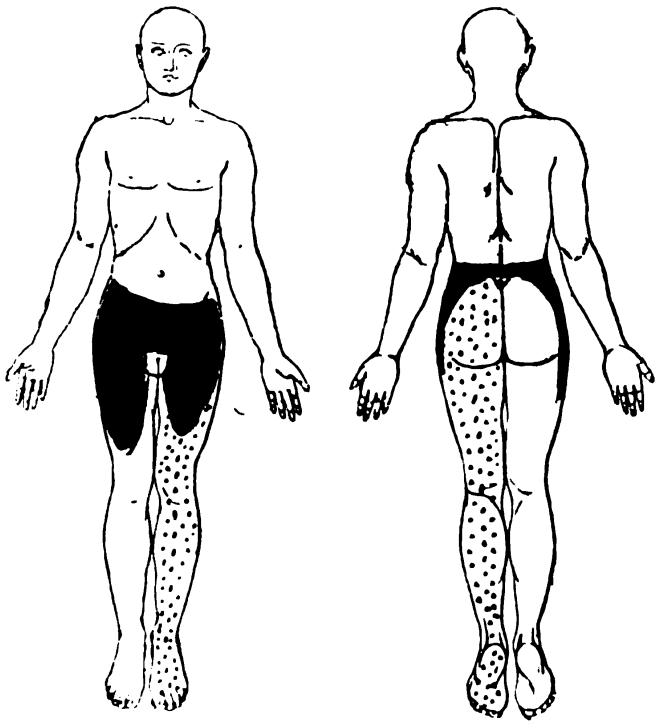
Pupils equal, react to light and accommodation. Ocular and facial muscles not affected.

Sensory.—Girdle pain in lower part of abdomen (below umbilicus) is chief complaint, as already described. No pain by pressure or percussion on spine, or by flexion of spine.

On careful examination *diminished* tactile sensation detected over area of distribution of the twelfth dorsal and first and second lumbar sensory nerve-roots. Over this area the touch with the finger is felt, but touch with cotton-wool is *not* felt. At the parts just outside this area the touch with cotton-wool is felt quite well. The area of diminished sensation, in which cotton-wool is not felt, commences on the lower part of the abdomen above the groin, at a point about midway between the umbilicus and the pubes. It extends down the front of the thighs to about the junction of the lower and middle thirds. On the legs below this level the touch of cotton-wool is felt. On the scrotum and penis the touch with cotton-wool is felt normally. The area of diminished tactile sensation extends a little lower on the right side than the left (see Fig. 1).

Posteriorly a strip of diminished sensation, over which cotton-wool is not felt, extends from one iliac crest to the other, above the gluteal region. This area of diminished sensation continues round the outer side of the thigh to the area of diminished sensation on the front of the thighs (see Fig. 2). Over the gluteal region, back of the thighs and other parts of the legs posteriorly sensation to cotton-wool and to finger-touch is normal. Sensation for warmth is lost over the same area as the diminished tactile sensation; on other part warmth is recognised normally. Sensation to cold is affected over the left leg but not over the right. Cold is not felt, or it causes a sensation of warmth, over the whole of the left leg, except over a very small area at the uppermost part of the thigh just below the groin.

Sensation for pain (pin-prick) is lost over the whole of the area on both legs on which cotton-



Figs. 1 and 2.—Over deeply-shaded area touch with cotton-wool not felt; also loss of sensation for pain and warmth over same area. Over dotted area sensation for pain lost and for cold affected.

wool is not felt, and also over all other parts of the left leg anteriorly and posteriorly (dotted area in Figs. 1 and 2).

Stated in another form we may say that over the *deeply shaded area* in the figures sensation is lost for (1) light touch (with cotton-wool), (2) for warmth, and (3) for pain (pin-prick).

Over the dotted area on the left leg sensation is also lost for pain (pin-prick) and lost or altered for cold, but not for touch and warmth.

Also sensation for cold is lost or causes a sensation of warmth over the deeply shaded area on the left leg but not on the right leg.

The sensation for deep pressure at all parts of the legs is normal.

The vibrating sensation is felt normally on both legs. The muscular sense is normal.

The heart, lungs, abdominal organs and urine are normal.

The symptoms clearly pointed to localised pressure on the spinal nerve-roots (as indicated by the girdle pain and diminished sensation to touch in the root areas affected), with slight pressure on the spinal cord (as indicated by the Babinski reflexes and the loss of sensation for pain and temperature on the left leg).

We had no indications of spinal curvature, or spinal caries, or of vertebral growth; no signs of tubercle or growth or syphilitic lesion in other parts of the body; no history of injury. The diagnoses most probable were meningeal spinal growth, which had compressed spinal nerve-roots but had, as yet, only very slightly affected the cord, or a syphilitic pachymeningitis. But we had no indications of previous syphilis, and the signs of pressure on nerve-roots were more definitely localised and more limited than is usual in syphilitic meningitis.

Hence the diagnosis of spinal meningeal growth appeared the most probable, and I recommended an exploratory spinal operation. Prof. W. Thorburn was of the same opinion, and performed the operation. A meningeal spinal growth infiltrating the dura mater was found, and was much more extensive than had been expected from the symptoms. Most of the growth was removed; but it was not possible to remove the whole of it. I examined microscopically portions of the growth removed, and found it to be a mixed-celled sarcoma. The patient recovered quite well from the operation, but paraplegia followed, and he was discharged from the hospital incurable many weeks later.

Remarks.

(1) The case is instructive as regards diagnosis. It shows the importance of bearing in mind the possibility of spinal meningeal growth in cases of abdominal pain, when the cause is not evident and signs of abdominal disease cannot be detected. In such cases the examination for root-zones of *diminished* cutaneous sensation and for early signs of spinal-cord affection is important.

[In another case seen more recently the chief symptom was pain at the upper part of the abdomen. At first the diagnosis was difficult, as the patient also suffered much from flatulent dyspepsia and constipation. But the pain was more or less of a girdle character. When first seen the possibility of early meningeal spinal tumour was very carefully considered, but no signs could be detected, and the reflexes, the movements of the legs and sensation were normal. The patient had suffered from the pain for 3 months, and though the possibility of meningeal growth was kept in mind, 4 months more elapsed before spinal symptoms could be detected. Then paraplegia developed acutely.

In two other cases which I have seen the diagnosis at first had been respectively gall-stones and stone in the kidney.]

(2) The case is also instructive because it was possible to give a probable diagnosis of meningeal spinal tumour, and to operate and remove part of the growth before the slightest paralysis had developed. Had the growth been more localised and not of such a malignant character probably satisfactory results would have been obtained.

In many cases of meningeal spinal tumour the symptoms are chiefly persistent localised root symptoms (girdle pain or pain in one limb), followed after a considerable time by paraplegia (of gradual or rapid onset). The paralysis increases in intensity, but not in extension upwards. In some rare cases root symptoms are absent; in such cases the motor and sensory symptoms increase in *intensity*, but do not extend upwards. The symptoms indicate increase in the cross-section intensity of the lesion without extension of the lesion upwards.

Root pains, if persistent, and associated with

diminished sensation in the root areas, should lead to a careful consideration of the possibility of meningeal spinal tumour, even if no paraplegia or paresis can be detected. In the differential diagnosis the following diseases have to be carefully considered, and only after such consideration can the diagnosis be fixed definitely: Spinal syphilitic affections, pachymeningitis, spinal caries, vertebral growth, intra-medullary spinal tumour, gliosis. At the early stage the root pain may have to be differentiated from gall-stones, stone in the kidney, intestinal colic, lead colic, brachial neuritis, root symptoms due to cervical rib and from sciatica.

(3) The early diagnosis of meningeal spinal tumour is very important, because by early operation partial or almost complete recovery from the symptoms may sometimes be obtained. The final results of operative treatment of cerebral tumour are very rarely successful, but in meningeal spinal tumour the results of operation are very much more frequently satisfactory, and a considerable number of such successful cases have now been recorded, in which almost complete recovery from the nervous symptoms has followed the removal of the tumour.

Cysts, gummata and tubercular masses may cause the same symptoms as those of meningeal tumour in the strict pathological sense, and often the diagnosis of the exact nature of the "tumour" cannot be made until it is removed or examined pathologically. Using the term "tumour" in the clinical sense, we find that in 110 cases which I have collected from medical literature 61 were non-malignant (including 16 hydatid cysts).

Using the term "tumour" in the strict pathological sense, about half of the cases I have collected were non-malignant.

I have collected from medical literature 78 cases of operation for meningeal tumour in which the patient not only recovered from the operation, but also recovered almost completely from the spinal symptoms (and probably many others have been recorded).*

These facts indicate the practical importance of the early diagnosis of meningeal tumour. If diagnosed at an early stage, and removed before incurable cord changes have been produced, in many cases almost complete recovery might be obtained. If operation is only performed at a late period, though the growth may be successfully removed, permanent changes will probably have developed in the cord, and paralysis will probably remain.

The diagnosis is often very difficult, and can only be made after a very careful consideration of the numerous spinal affections, which may produce somewhat similar symptoms, and after a very careful and detailed neurological examination.

The cases are rare, and are usually first seen by the general practitioner, but the important point is that the possibility of spinal meningeal growth should *not be forgotten.* This possibility should be carefully considered in many spinal diseases, because it is the one spinal affection in which early operation is so important and valuable. Also from the results of recent years exploratory laminectomy appears desirable and justifiable, even in certain cases when the diagnosis is not quite definite.

* Reference and brief notes of most of these cases are given in the writer's book, 'Diseases of the Spinal Cord,' 2nd impression, London, 1911.

The Walcher Posture versus Cæsarian Section.—H. F. Biggar protests against the too frequent performance of Cæsarian section. He has found the Walcher posture sufficient in a number of patients, even though Cæsarian section was advised by reputable surgeons, and the patients were willing to submit to the operation.

The patient is placed in the decubitus position on a table with one end so elevated that the nates project well over the edge, the legs hanging perpendicularly, the feet not touching the floor. When the head presents in the soft parts the end of the table is lowered so that the top is level. The patient is then put in the extreme lithotomy position and delivered with or without instruments. The Walcher posture increases the diameter of the superior strait of the pelvis ¼ in. or more.—*Journ. Amer. Med. Assoc.*, p. 913.

ACTINOMYCOSIS OF THE PAROTID GLAND: X-RAY TREATMENT.

By JOHN F. FERGUS, M.A., M D., F.R.F.P.S.G.,
Assistant to the Muirhead Professor of Medicine, Glasgow University.

TOWARDS the end of 1916 I saw a young lady, æt. about 18 years, for a swelling in the region of the right parotid gland. The history was that the swelling had occurred intermittently for some two or three years, and that in May, 1915, while at the coast, she was seen by a doctor who sent her to Mr. Nicoll of Glasgow, who found a fluctuant swelling over the right parotid which he then considered might be due to obstruction of Steno's duct, possibly from a calculus. The duct was explored but no calculus found. The gland got considerably swollen and painful after the exploration, but ultimately the swelling subsided to a considerable extent and gave little trouble till the early summer of 1916, when it became much larger and extended down almost to the angle of the jaw, while fluctuation was apparent over the greater part. An X-ray examination failed to show any calculus in the duct, and the condition becoming worse and pain more marked, the swelling was opened by an incision near the angle of the jaw by the patient's doctor in June, 1916. Much yellowish purulent material was evacuated with great relief, the swelling subsiding. The evacuated material was not, however, examined, either microscopically or bacteriologically, and the true nature of the swelling still remained obscure.

In September, 1916, the condition again became markedly worse, but showed considerable remissions from time to time, the amount of the swelling and the degree of fluctuation varying considerably, though gradually tending to get worse. During the autumn of 1916 the patient was seen several times by Mr. Nicoll, who, in view of the increasing severity, recommended further operative measures, though he pointed out the extreme difficulty, if not the impossibility, of the radical removal of a condition so largely involving and, indeed, infiltrating the parotid gland with all its intimate relations to the distribution of the facial nerve. The patient's parents were naturally averse to any operation which might disfigure an exceptionally pretty young lady, and, as the family medical adviser, I was called in towards the end of 1916 when the family had returned to Glasgow, and saw the condition for the first time.

There was a swelling about the size of a crab-apple over the right parotid extending downwards almost to the angle of the jaw, where the small scar of the incision made in June was visible, producing practically no disfigurement. The skin over the swelling was indurated, red and brawny and gave indistinct boggy fluctuation. There was a considerable mass of enlarged glands in the neck below the ear generally. Pain, worse on palpation, was not a marked feature. The general health was good.

Though Mr. Nicoll's proposed operation was only to go in through the scar of the original incision, and following the track of the sinus which had led down to it, to scrape away as much of the contents of the swelling as possible without injuring the branches of the facial nerve, the parents were reluctant to have this done except as a last resort. At my suggestion and with Mr. Nicoll's consent, applications of "iodex" ointment externally with the exhibition of iodides internally were tried for some time, and at first with gratifying result, the swelling subsiding considerably. But the improvement was only temporary, and towards the beginning of 1917 the condition was as bad as, if not worse than, it had been a couple of months before.

In view of the parents' natural reluctance to any operation—and possibly a disfiguring one—that was not absolutely necessary, I suggested obtaining the opinion of the *doyen* of surgical consultants in Glasgow—Sir Hector Cameron—a course to which Mr. Nicoll readily assented. Towards the end of January, 1917, a consultation took place between Sir Hector, Mr. Nicoll and myself. The swelling was considerably less than it had been a week before, fluctuation having almost disappeared, and the skin being less red and indurated, so that the condition presented for Sir Hector's consideration was practically a mass of enlarged glands. With some knowledge of the patient's family history Sir Hector was inclined to consider the condition as probably tubercular, while in the semi-quiescent state in which it was when he saw it he did not consider operation immediately necessary, though he indicated that it might be required in the near future if the condition again grew worse.

When discussing in a general way with the patient and her relatives the cause and course of the swelling, the young lady herself mentioned casually that when away at school she had on one occasion some years previously eaten some raw grain—she said it was barley—which she had plucked while passing through a field, and that some of it had stuck in her throat and caused her considerable pain, and indeed some swelling of the right tonsil, which gave her a good deal of trouble, and persisted for some time; but apparently she had not connected this incident with the swelling which subsequently developed. On hearing this story of the eating of raw grain, which had caused some injury to the mucous membrane of the mouth or fauces, I suggested the possibility of actinomycosis.

Shortly after Sir Hector saw the patient the condition again became worse, so much so that operation became obviously necessary, and about the end of the first week in February the patient went into a nursing home, where Mr. Nicoll operated, using the old scar for his incision, and carefully scraping out the contents of the swelling by a small spoon passed up from the original wound. Despite the utmost expertness and care some of the twigs of the facial were touched, and there was some slight paresis and distortion of the face for a few weeks, but this rapidly passed off, and the patient was much relieved by the operation.

In view of the indefiniteness of the cause, the evacuated material, which was partly pus and partly yellowish masses, was sent for examination by Dr. Haswell Wilson, of the Pathological Department of the University and Western Infirmary. He reported that the case was unequivocally one of actinomycosis, showing the characteristic filaments. It came almost as a surprise to have the very problematical diagnosis of actinomycosis—founded on a history of some raw barley having been eaten several years previously—so completely verified.

The formidable nature of the disease gave rise to considerable anxiety, while the treatment was matter for grave consideration, especially as the growth was situated where it could not be treated by free surgical measures without the risk of great disfigurement and permanent facial paralysis.

As the parasite belongs to the streptothrix group of the higher bacteria, and as some cases had been recorded as successfully treated by a vaccine, that treatment naturally suggested itself. At Mr. Nicoll's instigation Dr. Haswell Wilson attempted to prepare a vaccine. But, as pointed out by Muir and Ritchie in their 'Manual of Bacteriology,' "the term actinomycosis does not represent one parasite but a number of closely allied species, as cultures obtained by various sources have presented considerable differences." Whatever the exact species of the actinomycosis obtained from this patient, it proved very difficult to cultivate, and slow and sparse in growth, so that Dr. Wilson was unable to obtain a proper vaccine from it, and that treatment had to be abandoned.

The patient left the nursing home towards the end of February considerably improved by the operation, the swelling having largely subsided, though there was still a good deal of thickening over and around the parotid and some enlargement of the neighbouring glands persisted, but her general health was good and the slight facial paralysis had almost disappeared.

It was determined to try the effect of a course of X rays applied by an expert radiologist. The patient was placed in the hands of Dr. Katharine Chapman, who, after treating the facial paralysis electrically for a fortnight, began the X-ray treatment of the actinomycotic swelling on March 16th. Exposures were given every four days for a fortnight or so, and after that at longer intervals till Christmas, 1918, *i.e.* for rather more than eighteen months. The disease was then apparently perfectly cured. When the treatment was stopped the X rays were being applied only once a fortnight. During a considerable period of the treatment iodides were given internally in one or other of the organic forms.

There has been no recurrence of the disease and it is now hard to say where the original lesion was, the small scar of the operation near the angle of the jaw being scarcely noticeable. All swelling and glandular enlargement have gone and the young lady has been in excellent health since the X-ray treatment was stopped. She was able to take work as a V.A.D. in one of the hospitals, and since peace to engage in all the usual activities and recreations of her age.

The mouth is perhaps the most common portal of entry of the actinomyces, the jaw, neck and tongue being the parts most frequently affected, the jaw perhaps most particularly where the great connective

tissue proliferation with the formation of nodular masses gives rise to a condition closely resembling, and indeed often mistaken for, osteo-sarcoma. The jaw is, of course, in cattle the most common site of the disease, where the bulky nodular masses connected with the bone give rise to the condition known popularly as "big-jaw," while the "woody tongue" in cattle is somewhat similar. But in the present case the disease seemed to be limited to the parotid gland and its immediate neighbourhood, and there never was any suggestion of the jaw-bone itself being involved.

The formation of pus, giving the variable fluctuation which was a feature during the greater part of the course, was in accordance with the course which the disease takes in man. The formation of granuloma, going on to fibrosis with a very chronic course, is more common in cattle. It has been suggested that this difference is due to the differing types of the parasite.

In cattle the parasite is practically always the "ray-fungus," with the central portion of the colony formed of a network of narrow filaments which have a radial arrangement at the periphery, where the sheaths of the radial filaments expand to form the typical "clubs" or flask-like bodies with their narrow extremities pointing inwards. But in man, as D'Este Emery observes, "there are numerous species of fungus which can bring about infection and cause the disease known clinically as 'actinomycosis.' This disease is therefore not a specific entity due to a single cause, but a group of allied diseases, just as suppuration is." Though the organisms producing the clinical disease actinomycosis are all members of the genus *Streptothrix* and as such consist of long filaments of mycelium, which differ from the bacteria in showing true branching and in breaking up into "chain spores" resembling chains of cocci, the different species vary so much in microscopical appearance as sometimes to make a definite diagnosis of actinomycosis difficult. "In some cases the fungus will assume the form of threads in masses without any definite arrangement, and in others the threads will be isolated; in either case it will usually be possible to find threads showing true branching or chain spores, and this is sufficient for the diagnosis. In yet others the bulk of the mycelium splits up into short lengths greatly resembling bacilli, and when this happens the diagnosis may be missed unless a careful search happens to reveal an unbroken piece of mycelium" (Emery).

The X-ray treatment seemed to be *the* factor which determined the cure. Possibly the iodides may have had some effect in helping absorption, but as the patient was rather intolerant of them, even in the organic forms, the doses were much smaller than those usually recommended for this disease. Moreover their administration before the X-ray treatment seemed to have little effect on the disease, and that at best only temporary.

A Simple Operation for Prolapsus Uteri in Elderly Women.—A. Venet points out that the usual methods of treating severe cases of genital prolapse in elderly patients by suspension of the uterus and restoration of the pelvic floor often fail from insufficiency of the amount and quality of the tissue at the disposal of the surgeon. There appears to be indicated in many cases a simple rapidly performed operation. Great relief may be secured by narrowing the vaginal orifice by a circular suture of silver wire. The vagina and surrounding parts are prepared with alcohol and tincture of iodine. Under general anæsthesia a sound is inserted into the urethra, and a small transverse incision made in the anterior vaginal wall, which is separated from the urethra for about 1 cm. A similar incision is made in the posterior vaginal wall, and a silver wire is passed by means of a well-curved Reverdin's needle in two stages completely round the vaginal orifice so that both ends project from the anterior incision. Traction is then made on the ends of the wire, which are knotted on the handle of the Reverdin's needle, which is rather thicker than an average thumb. The knot, which should be as small as possible, is placed to one side of the urethra and the two small incisions are closed with a few catgut sutures, which should be superficial to the line of the wire. Care should be taken that the wire is not drawn too tight, when it may cut its way out. This operation gives complete support to the uterus and enables the patient to work in comfort. Should it later become necessary to open up the vagina, the constriction is easily removed.—*Journ. de Méd. de Bordeaux*, p. 337.

OPERATIVE TREATMENT OF FLAIL ELBOW.

By R. ATKINSON STONEY, F.R.C.S.I.,

Visiting Surgeon, Royal City of Dublin Hospital; Médecin Major, 2ème classe Armée Française; late Operating and Consulting Surgeon, V Section, 12ème Région.

THOUGH in suitable cases, excision of the elbow may give very good results even after the extensive injuries caused by modern explosives, as shown by a paper I read before the Surgical Section of the Royal Academy of Medicine in Ireland in 1917,* yet many cases have been operated on where, through faulty technique, or from some other perhaps unavoidable cause, failure has occurred, and a completely flail arm has been the result. As explained in the paper referred to above, the chief causes of failure are (1) very extensive loss and destruction of the bones, either humerus, or ulna and radius, or all three. This is to a large extent unavoidable in some cases, and depends chiefly on the extent of the original injury. (2) Loss of continuity between the triceps tendon and the periosteum on the back of the olecranom process and the deep fascia of the back of the forearm. This may be destroyed by the wound, or by prolonged and extensive suppuration, but is more commonly due to faulty technique during the operation. (3) The third cause is absence of or want of perseverance in exercises, massage and electrical treatment after operation, to restore the voluntary power of the flexors and extensors of the elbow joint.

Whatever the cause, the result is the same, the patient has no voluntary power of movement in the elbow, though the passive movements are abnormally free, not only in flexion and extension, but also in a lateral direction. The lower end of the humerus usually projects unduly under the skin when any movement is attempted, and the condition is that commonly known as "flail elbow."

Where the destruction of tissue caused by the wound, or the resulting suppuration, has been very great, it is probably impossible to remedy the condition by operation, and all that can be done is to try and ameliorate the condition by some kind of extraneous support, such as a leather bracelet with elastic traction to keep the forearm in a suitable position. In some cases, especially where the left elbow is involved, it might be advisable to try and produce bony ankylosis in the position most suitable to the patient's employment. In cases, however, where the bad result is not due to extensive loss of substance, but rather to faulty technique, the condition can be considerably improved by a suitably planned operation, as is shown by the following two cases operated on in France in the summer of 1918.

CASE 1.—Soldier, æt. 35 years. Wounded August 3rd, 1917, by shell splinter. There was extensive destruction of the lower third of the humerus, and the articulation of the elbow was opened. An operation was performed at the front, when an extensive amount of the lower end of the humerus was removed and a quantity of the injured muscle was excised. On September 27th, 1917, the joint was excised. I saw the case first in June, 1918, when the elbow was completely flail, the upper arm was between two and three inches shorter than the other, there was extensive scarring round the elbow, and the pointed end of the humerus projected under the thinned skin on the outside when the patient attempted to flex the elbow. There was still a small fistula over the lower end of the humerus.

Operation was performed on June 15th, 1918. The sinus was completely excised. The tissues were divided on the back of the humerus for two inches, the bone was cleared of periosteum and muscles in one layer. Half an inch of the pointed extremity of the bone was removed with the saw, in order to get a broad flat surface. A vertical incision was made through the fibrous tissue where the joint should have been, and this was continued down through the remains of the triceps still adherent to the base of the olecranom process, the periosteum and fascia over the back of this were also divided. A hole was bored antero-posteriorly through the upper end of the ulna and the lower end of the humerus, and the two bones were united by a four-fold strand of strong silk-worm gut. A good deal of dissection had to be done in the dense fibrous tissue to make a bed for the lower end of the humerus and to allow it to be drawn down into contact with the ulna. The whole area was thoroughly impregnated with

* 'Transactions of the Royal Academy of Medicine in Ireland,' vol. xxxv.

modified bipp.* The remains of the triceps, the deep fascia, the fibrous tissue and periosteum were sewn over the lower end of the humerus by catgut in two layers, and the skin was closed with silk-worm gut and Michell's clips. The elbow was flexed to an angle of 75° and was put up with a thick layer of cotton wool, a tight bandage and a sling, but no splint. The first dressing was done on the fifth day, when the clips were removed and a little blood-stained fluid let out. There was no suppuration or rise of temperature, though some of the old scarred skin sloughed and left a persistent fistula. On July 20th it was almost healed; the thick layer of wool was removed, and the patient was allowed to move the arm; there was already some power of movement of the elbow. Six days later, massage and electrical treatment were begun. A month later, a piece of the silk-worm gut appeared in the fistula, which was still unhealed. With a little difficulty, all the silk-worm gut was removed, and the fistula then healed rapidly, and the patient left hospital on September 15th, 1918, with the wound completely healed and a very fair power of movement. He was able to touch his head and could feed himself and even lift small weights. Here the result was delayed by the persistence of the fistula, which was caused in the first instance by the sloughing of the skin (probably the result of using Michell's clips to unite scarred skin), and was kept up by the irritation of the cut ends of the silk-worm gut strands used to unite the bones. They, however, served their purpose in keeping the ends of the bones in position till the healing of the surrounding tissues was sufficiently advanced. The final result was quite as good as could be expected considering the very extensive loss of bone which had occurred.

Case 2.—A. J—, soldier, æt. 27, wounded June 6th, 1918, had his right elbow excised at the front, and was admitted to hospital on October 2nd, 1918, with a flail arm. The elbow was recently cicatrised and the X rays showed that the bones had been sutured with thin wire, which had broken. There was no power of voluntary movement of the elbow, and on attempted flexion the lower end of the humerus projected under the skin on the postero-external aspect of the arm. Passive movement in a lateral direction was very free. An operation was performed on October 14th, 1918. A vertical incision was made through the cicatrix on the posterior aspect of the joint, and the lower end of the humerus was cleared subperiosterally; it was very irregular, and was removed by the saw so as to leave a flat surface. The upper end of the ulna was also cleared and the coronoid process partially removed by bone forceps. The capsule and fibrous tissue in front of the bones was then divided vertically, until the fibres of the brachialis anticus were seen. The humerus and ulna were then pierced from side to side and united by a triple strand of thick silk-worm gut, which was tied sufficiently loosely to allow of free flexion and extension. The lower end of the humerus was pushed forwards and the fibrous tissue was stitched behind the bone with thick catgut, after impregnating the whole area with modified bipp. The muscles and deep fascia were then sutured with catgut and the skin closed with silk-worm gut, and the arm put up in a position of flexion with wool and a bandage, but without a splint. The stitches were removed on the seventh day, when the wound was found soundly healed. Massage, movements and electrical treatment were started at the end of 10 days, and on November 19th, 5 weeks after the operation, the patient left the hospital with good voluntary movement of his elbow, he could put his hand to his mouth and was able to use his right hand to feed himself.

The important points of the operation are the freeing of the ends of the bone, and section, so as to provide as broad surfaces of apposition as possible; division of the fibrous tissue in front of the bones, so as to allow of their displacement forwards, and suture in layers of the tissues behind the bones—in this way a new joint is formed; union of the bones by some flexible material, in order to limit lateral movement. Wire of any kind is too stiff and liable to break, and catgut, even if chromicised, would tend to be absorbed or stretch too quickly. Silk-worm gut is flexible, strong and non-absorbable, and would seem to serve this purpose admirably, if a double or treble strand is used. In the first case, it kept up irritation and prevented healing; this was due to the fact that it was passed in an antero-posterior direction and had not a sufficiently thick covering of healthy tissue. In the second case, this difficulty was got over by passing

* Iodoform 2; bismuth 1; vaseline 12; and enough hard paraffin to make the preparation of the consistency of butter.

it from side to side, so that it was well buried and did not come in contact with the line of suture. Finally, it is most important that massage and electrical treatment should be undertaken from an early date and persevered in. As the disability caused by flail elbow is so great, it is advisable to make a careful examination in every case, and to undertake an operation if there appears to be any chance of ameliorating the condition. As these two cases show, operation may bring about considerable improvement, even in cases that might not be considered promising according to generally accepted standards.

How to Make Poor Plaster Adhere.—A. L. Soresi says that during the war numerous compound fractures needed continuous traction. Traction was often difficult for two reasons: The skin was badly inflamed, so that the areas of healthy skin to which to stick the plaster were very scanty. Moreover, some of the wounds, being badly infected, had an abundant secretion that would soak the plaster and diminish its sticking qualities. The adhesive plaster was at times of very poor quality.

A simple expedient was adopted. The common rubber cement used in patching tyres was diluted in about 10 parts of ether. This was painted on the area to which it was intended to apply the plaster. Even the poorest plaster adhered immediately and remained adherent for a long time. If the secretion was very abundant, the same rubber solution was painted outside the plaster after it had been applied, so as to make the cloth waterproof.

The reason adhesive plaster adheres better if the skin is painted with a solution of rubber is that the solution of rubber and ether adheres strongly to the skin, and the adhesive plaster in turn adheres firmly to the rubber that covers the skin.—*Journ. Amer. Med. Assoc.*, p. 766.

REVIEWS.

MATERIA MEDICA AND THERAPEUTICS. By J. MITCHELL BRUCE, M.A., LL.D., F.R.C.P., and W. J. DILLING, M.B., Ch.B. Eleventh Edition. London: Cassell & Co., Ltd., 1918. Foolscap 8vo., Pp. 688. 9s. net.

In a recently published American book on the training of the physician the question was put to 138 practitioners as to what was lacking in the medical curriculum to fit one for his particular work. The answer in over 50 per cent. was "Pharmacology and Therapeutics." From this it might be inferred that the study of the subject is as inadequate in the States as it certainly is in the English medical schools. Some revision is called for in the teaching and practice of this important subject, for the student who has finished his medical studies, starts practice badly equipped, and falls a ready victim to the habit of prescribing proprietary medicines and compressed ready-made remedies. That the defect appears in the practical side and not the theoretical is shown by the study of this book, which for 34 years has been a useful guide to both the student and the practitioner. The eleventh edition fully maintains the high reputation established by its predecessors. A felt want is supplied by the section on prescribing, especially as it has been affected by the lack of drugs due to the war. The war is also responsible for the advent of others, chiefly antiseptic, owing to the new problems presented by war wounds.

The issue of a new British Pharmacopœia has involved extensive changes in the text and the addition of 40 new remedies. In the appendix surgical dressings and their medication, electrotherapeutics ionisation, massage and remedial exercises have all been revised and considerably amplified. The book is one of the best on rational use of drugs.

MILITARY PHYSICAL ORTHOPÆDICS. Part I: GUNSHOT WOUND OF NERVE. By ARTHUR STANLEY HERBERT, M.D., B.S. Wellington: Marcus F. Marks, Pp. 136. Price 6s.

This little book, with its 60 pages of printed matter, and 60 plates, besides a few useful diagrams, is really what it is represented by its author to be—

"Crystallised Results of Considerable Experience." It is a little difficult to know where military surgery ends and orthopædics start, and physical orthopædics seems still more difficult to define. Deformities and trophic changes resulting from lesions of nerves are described and well illustrated (the photographic plates are particularly good and well chosen), and the different methods of treatment are given. The writer lays great stress on replacement of paralysed muscle by elastic bands. The application of special splints for arm and leg deformities and rest of muscles, in practical relation from outside teaching or assistance, show a great amount of ingenuity, and a closeness of method to that ultimately adopted in this country. The illustrations are excellent, but fuller details should be given in the text, if the book is to be of use to the general practitioner.

THE STUDENTS' POCKET PRESCRIBER. By D. M. MACDONALD, M.D., F.R.C.P. Edinburgh: E. & S. Livingtone, 1910. Sixth Edition. Pp. 200. 2*s.* net.

The fact that this book has reached a sixth edition is a tribute to its popularity. Formerly known as 'Husbands' Pocket Prescriber,' the title has been altered as above, because the book has been entirely recast. While the essential features are retained the changes increase its usefulness without increasing its size. Such are "Points in Prescribing," which deal with some of the common errors in the construction of a prescription, with practical hints in drugs, and how best to combine and administer them. A dosage table for adults and children has been added to meet a frequent request.

ELEMENTS OF SURGICAL DIAGNOSIS. By Sir ALFRED PEARCE GOULD, K.C.V.O., M.S. Lond., F.R.C.S.Eng., and ERIC PEARCE GOULD, M.D., M.Ch.Oxon, F.R.C.S.Eng. Fifth Edition, Revised, with 15 Radiographic Plates. Cassell & Co., Ltd., London and New York, 1919. Price 12*s.* 6*d.*

This favourite manual on surgical diagnosis by Sir Alfred Pearce Gould, aided by his son, appears in its fifth edition, revised, and with some additional letterpress. It has been brought up to date, the fruits of war experience find a place, additional excellent X-ray plates have been introduced, and what is now considered unnecessary or out of date has been omitted. Its already high value to the student, and we may add, to the general practitioner, are enhanced. Its lucid style is a valuable feature. The student has no more reliable or instructive book of reference.

The Tip-toe Sign of Sciatica.—Chiray and Roger describe a new sign of sciatica which they term the tip-toe sign (*signe de la pointe*). In a sciatica of any gravity the patient cannot raise himself on tip-toe on the affected side or, if he can do so momentarily, he cannot maintain the position. This is due to muscular weakness and not to pain provoked by the movement. To test for this sign the feet must be naked, for with a boot on the foot the attitude may seem to be realised by means of certain muscular substitution. The patient is first asked to stand on tip-toe on the sound side and as long as possible. The affected side is then tested and the posture is found completely impossible. Sometimes the appearance of realising it is produced because the patient can raise himself for an instant by a spring, but he cannot maintain the posture. When asked why he cannot make the movement he usually says he has not sufficient strength in the foot. He rarely invokes pain, which is easy to understand, for the movement relaxes the sciatic nerve.

The value of this sign is considerable. It usually appears early and is found in all lesions of the sciatic territory, whether roots or trunk, as soon as the process has attained a certain intensity and duration. When absent it can be stated that the motor neurons are not yet affected and a favourable prognosis can be given. On the other hand, its presence is a sign of gravity and permanence, since it reveals a muscular change and allows the reaction of degeneration, beginning or established, to be affirmed. If the sign appears after the pain it also long outlasts it. Motor recovery of the nerve does not take place as rapidly as sensory. The sign is more delicate than loss of the tendo Achillis reflex and occurs earlier.

The mechanism of the sign is explained as follows: Before raising the body on the toe it is

inclined slightly forward so as to throw the weight on the ball of the foot, which sets free the heel and allows it to be raised by the calf muscles. At the same time the peroneus longus and plantar muscles maintain the rigidity of the foot.

Experiences in the war showed the part played by all these muscles in the movement. In all lesions, however slight, of the sciatica nerve with paresis of the muscles of the calf and the plantar muscles, standing on tip-toe was impossible. The same occurred in lesions of the posterior tibial or plantar nerves, when the plantar muscles alone were affected, and also in lesions of the external popliteal until the peronei had recovered power. In spite of strong contraction of the calf muscles the heel could scarcely be raised from the ground. On the other hand, in the case of a wounded man presenting reaction of degeneration of the anterior tibial nerve below the peronei, which were unaffected, the movement was normal. The same occurred in a lesion of the musculo-cutaneous. Thus standing on tip-toe requires the participation of three groups of muscles—the calf muscles, the peroneus longus and the plantar muscles. Failure of one of these groups produces difficulty or impossibility of the movement. Hence the importance of the tip-toe sign in sciatica. It is the only or the principal objective element in an affection in which all the symptomatology depends on the truthfulness of the patient.—*Bull. de la Soc. Méd. des Hôp.*, p. 129.

Pyosalpinx Containing a Round-worm.—C. M. Saint describes the case of a virgin, æt. 16 years, admitted to hospital with abdominal pain, vomiting and a rise of temperature. She had been ill for some days. The pain was in the lower abdomen and more or less continuous. She had vomited several times. There was some pain on micturition, producing delay in commencing the act, and being rather worse towards the end of it. Menstruation was regular and somewhat excessive, and there was accompanying pain.

On examination her general condition was good, temperature of 100° F. and pulse of 84. There were hypogastric tenderness and some rigidity, especially in the right lower rectus. The cervix uteri was displaced to the left side, and the right fornix bulged downwards and was very tense. It was very tender on pressure. There was no discharge from the urethra or vagina. The possibility of an infected broad-ligament cyst was entertained in preference to a pyosalpinx.

The abdomen was opened by a mid-line incision, with the patient in the Trendelenberg position. There were some omental adhesions and evidence of recent acute peritonitis in the pelvis. The right broad ligament was greatly distended by an egg-shaped swelling almost closing up the true pelvis flush with the brim, the uterus being pushed well over to the left side, and at this spot alone could a finger be introduced into the pelvis. The left tube and ovary appeared to be normal. The right broad ligament was incised along its upper border, and the cystic structure shelled out of its bed. As the separation was being completed the cyst burst, and there was an escape of foul pus, and a dead round-worm, 3½ in. long. After removal of the abscess-wall a tube drain was introduced into its bed and brought out into the vagina. The broad ligament was sutured completely up and the abdomen closed in layers without drainage. The appendix was seen quite free from adhesions, and apparently normal.

For some days there was a discharge of foul pus *per vaginam*, but this rapidly cleared up, and recovery was uninterrupted. The specimen proved to be a pyosalpinx.

The interesting point was the presence of the round-worm. In the absence of any sign of gut or appendix adhesion, Saint is constrained to believe that it affected an entrance into the Fallopian tube through the vagina and os uteri.—*Edinburgh Med. Journ.*, p. 387.

The Cerebral Complications of Mumps.—Lieut. R. L. Haden, U.S. Army, points out that while mumps and orchitis, the only common complication, usually run a benign course, yet serious complications may occur. Six deaths from mumps are recorded in the Index-Catalogue of the Surgeon-General's Library. Recently other fatal cases have been reported. Death is probably always due to the cerebral complications. The fact that the central nervous system may be affected in mumps has long been recognised, the first fatal case being reported in 1758. Approximately 150 cases of cerebral complications, exhibiting a variety of symptoms, have been reported. The nature of the cerebral complications has been much dis-

cussed. Before the advent of lumbar puncture they were considered as meningismus, but with the demonstration of a pleocytosis of the spinal fluid as meningitis. In simple mumps, according to Dopter, the spinal fluid is normal.

Many things point to the conclusion that the fundamental condition is an encephalitis and not simply a meningitis. In most cases the cerebral symptoms are out of all proportion to the meningeal reaction, as evidenced by the condition of the spinal fluid. The common symptoms are high fever, headache, nausea and vomiting. Usually there is only slight rigidity of the neck and no well-marked Kernig's sign. Numerous cases occur of undoubted involvement of the cerebrum alone, as recorded below. In these cases there were no definite meningeal signs and no pathologic findings in the spinal fluid. Among the symptoms noted were unilateral convulsions, monoplegia, hemiplegia, aphasia, speech disturbances, psychosis, disturbances of sensation and stupor. Such symptoms point to affection of the brain substance. Other symptoms, such as bradycardia, headache, vomiting and optic neuritis are probably due to increased intracranial pressure. Unfortunately the spinal fluid findings are recorded in only 3 instances.

Nine cases of cerebral complications were observed among 476 cases of mumps at a base hospital in America. The patients exhibited a fairly uniform symptom-complex. Usually, as the parotitis was subsiding, there was a rise in temperature, severe headache, nausea and vomiting. Often there was orchitis. On examination the patient was dull, answered questions slowly, showed slight stiffness of the neck, a suggestive Kernig's sign and variable reflexes. Lumbar puncture gave a clear fluid under increased pressure, with a lymphocytosis. Lieut. Haden does not believe that the number recorded in this series shows the true percentage of cerebral involvement. Patients suffering from mumps often have severe headache and fever, sometimes with vomiting. There are no other signs of meningitis and nothing is found elsewhere to account for the symptoms. Many such cases are mild encephalitis. The following is an example:

A wagoner, æt. 21 years, was admitted to hospital on February 3rd, 1919, complaining of headache and swelling of the neck and occasional nausea. Three weeks previously he first noticed a swelling on the right side of the neck and under the jaw. The right submaxillary glands were swollen; the temperature and pulse were normal. On February 5th the left parotid became swollen and on the 9th bilateral orchitis was noted. On the 10th the patient became very dull and suffered from headache and vomiting. The temperature was 105°F., pulse 180. On the 11th he began to be very drowsy and was still vomiting. There was definite stiffness of the neck although the pupils were active. The knee-jerks were not obtainable and the right biceps reflex was barely noticeable. Kernig's sign was positive, Babinski's negative. Lumbar puncture gave a clear fluid under increased pressure. Marked improvement immediately followed. On the 13th the pulse was only 48 and the temperature was subnormal. The patient stated that he could not see well. During the night he became delirious. On the 14th he appeared to be in a stupor, the head was retracted and the pupils reacted sluggishly. Deep reflexes could not be elicited and lumbar puncture gave a clear fluid. Next day he improved, and recovery was then rapid.

Laboratory findings.—February 12th, the leucocyte count was 6,200. Differential count: Small mononuclears, 48 per cent.; large mononuclears, 6 per cent.; eosinophiles, 5 per cent.; polymorphonuclears, 41 per cent. February 11th, the spinal fluid contained 10 cells per c.mm., all mononuclears; sugar present. Culture and smear were both negative. February 14th, the spinal fluid contained only 5 per c.mm., all small mononuclears. —*Arch. of Intern. Med.*, p. 737.

The Nails in Arsenical Poisoning.—Mees has encountered 3 cases in which an attempt at suicide or murder, with arsenic, was followed by the development of a broad white band or frame in the finger-nails. All the nails were affected, and as the white band reached the outer edge of the nails it grew less distinct. He considers that the white band is a deposit of arsenic in the nails. The discovery of these broad white bands in the nails with arsenical polyneuritis will confirm the diagnosis. The band is still distinct long after the arsenic has disappeared from the urine.—*Journ. Amer. Med. Assoc.*, p. 1337.

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